SOVIET GEOGRAPHY:

REVIEW & TRANSLATION

MAY 1961

Published by
AMERICAN GEOGRAPHICAL SOCIETY
Broadway at 156th Street, New York 32, N.Y.

Vol. II No. 5 May 1961

Soviet Geography: Review and Translation

THEODORE SHABAD, *Editor and Translator*

Advisory Committee

CHAUNCY D. HARRIS, *Chairman* CHARLES B. HITCHCOCK, *Consultant*

GEORGE B. CRESSEY
EDWARD B. ESPENSHADE, JR.
DAVID J. M. HOOSON
W. A. DOUGLAS JACKSON
HUEY LOUIS KOSTANICK
PAUL E. LYDOLPH
ALOYS A. MICHEL
JOHN A. MORRISON
ALLAN L. RODGERS
THEODORE SHABAD
ROBERT N. TAAFFE
JACK R. VILLMOW

Soviet Geography is published by the American Geographical Society to make available in English reports of current Soviet research in geography. Most of the reports are translated from *Izvestiya Akademii Nauk SSR, Seriya Geograficheskaya*, the journal of the Institute of Geography of the Academy of Sciences of the USSR; *Izvestiya Vsesoyuznogo Geograficheskogo Obshchestva*, the journal of the Geographical Society of the USSR; *Vestnik Moskovskogo Universiteta, Seriya Geografiya*, and *Geografiya i Khozyaystvo*, publications of the Geography Faculty of Moscow University, and *Voprosy Geografii*, a serial publication of the Moscow branch of the Geographical Society of the USSR. In addition to translations of geographic articles, *Soviet Geography* will contain news notes on Soviet political and economic developments of interest to geographers, and a survey of Soviet geographic literature.

This translation and publication project was undertaken by the American Geographical Society in the conviction that the dissemination of the fruits of Soviet geographic research would be a service to American geographers and would help bring about professional contacts between geographers of the two countries. The National Science Foundation encouraged the project and is supporting it by a grant.

Readers are invited to send in their comments and discussion of articles published in *Soviet Geography*. Readers are also encouraged to submit suggestions as to published Soviet geographic literature worthy of translation. Such suggestions should relate to articles of general substantive or methodological interest rather than materials of narrow, specialized appeal.

The subscription rate for *Soviet Geography* is $6 a year. The price of a single copy is $1. Address all editorial and subscription inquiries to: *Soviet Geography*, American Geographical Society, Broadway at 156th Street, New York 32, New York.

Published monthly (except July and August) at the Lane Press, 305 St. Paul Street, Burlington, Vermont, by the

AMERICAN GEOGRAPHICAL SOCIETY

Editorial and General Offices: Broadway at 156th St., New York 32, N.Y.

Price $1.00 a number $6.00 a year

Second-class postage paid at Burlington, Vermont

SOVIET GEOGRAPHY: Review and Translation

Vol. II, No. 5 May 1961

Contents

The Third Congress of the Geographical Society of the USSR

Water-Heat Balance Symposium — Page

The Moisture and Heat Factors of Soil Formation -- I. P. Gerasimov — 3

The Place of Regional Economic Geography in the System of Geographical Sciences -- V. V. Pokshishevskiy — 13

The Moscow Branch of the Geographical Society of the USSR in the Next Few Years -- Yu. K. Yefremov — 23

Recent Tendencies in the Development of Geography At Moscow University -- A. M. Ryabchikov — 29

Geological Maps in National Atlases -- N. V. Krasil'nikova — 33

Population Maps in National Atlases -- O. A. Yevteyev — 41

Climate Maps in National Atlases -- I. N. Guseva — 49

A Detailed Geographical Field Study of Solonets Complexes in the Dry Steppe Zone -- S. V. Golovenko, N. A. Yegorova and N. P. Osadchaya — 56

Sovetskaya Geografiya, Itogi i zadachi (Soviet Geography, Results and Tasks) (Reviewed by I. P. Gerasimov) — 69

International List of Geographical Serials -- Chauncy D. Harris and Jerome D. Fellmann (Reviewed by M. P. Petrov) — 74

A Soviet Review of Soviet Geography — 76

News Notes -- Theodore Shabad — 80

Current Literature — 82

Notice to Readers: Reprints of the issues Nos. 1-2, 3, 4, 5 and 6 of 1960, temporarily out of print, are now available.

TRANSLITERATION TABLE

Russian			English	Russian			English
А	а	*а*	a	Р	р	*р*	r
Б	б	*б*	b	С	с	*с*	s
В	в	*в*	v	Т	т	*т*	t
Г	г	*г*	g	У	у	*у*	u
Д	д	*д*	d	Ф	ф	*ф*	f
Е	е	*е*	e*	Х	х	*х*	kh
Ж	ж	*ж*	zh	Ц	ц	*ц*	ts
З	з	*з*	z	Ч	ч	*ч*	ch
И	и	*и*	i	Ш	ш	*ш*	sh
Й	й	*й*	y	Щ	щ	*щ*	shch
К	к	*к*	k	Ъ	ъ	*ъ*	"
Л	л	*л*	l	Ы	ы	*ы*	y
М	м	*м*	m	Ь	ь	*ь*	'
Н	н	*н*	n	Э	э	*э*	e
О	о	*о*	o	Ю	ю	*ю*	yu
П	п	*п*	p	Я	я	*я*	ya

(*) Instead of e, use ye at the beginning of names, after vowels and after the soft sign (').

The transliteration table is supplied for the general information of readers and to enable them to identify the geographic names on maps that will be reproduced from time to time in SOVIET GEOGRAPHY.

The transliteration system is the one proposed by the United States Board on Geographic Names. For more general use in textbooks and other popular needs, the following simplifications are recommended by the editor of SOVIET GEOGRAPHY:

1. Eliminate the use of (') and (").
2. Use i for iy, and y for yy.
3. Convert diphthongs ay, ey, oy, uy to ai, ei, oi, ui.

THE THIRD CONGRESS OF THE GEOGRAPHICAL SOCIETY OF THE USSR

THE MOISTURE AND HEAT FACTORS OF SOIL FORMATION

By I. P. Gerasimov

(Abstract: The paper surveys the present state of the study of the moisture and heat factors of soil formation under the geographic, genetic and agronomic approaches of soil science. The author finds that despite the single physical nature of the phenomena to be studied they have been investigated separately within the framework of each of these approaches. He calls for an integrated study of the moisture and heat factors by the soil-science field as a whole and outlines specific steps.)

It is hardly necessary to prove the enormous significance of moisture and heat factors in soil-formation processes. These factors control all physical, chemical and biologic phenomena that constitute in their totality the genetic essence of soil formation. It is quite possible, by using an analytic approach, to express the relationship between almost any oneof these phenomena taken separately (for example, the weathering of the mineral part of the soil and the formation of the clay minerals; the decay of organic residue and the formation of humus; the movement of the water-soluble substances in the soil) and a certain loss or gain of soil heat and moisture. It is considerably more difficult to solve this problem synthetically with respect to the totality of the conflicting phenomena occurring simultaneously in the soil, that is, with respect to soil formation as a whole.

It is well known that the end-product of the totality of processes occurring in the soil is the genetic soil profile. On the basis of similarity or difference in the structure of the genetic profile, the various soils are scientifically classified, i.e., assigned to different soil types, subtypes, species, genera, varieties, etc. Thus, the fullest account is taken in soil science of the different combinations of physical, chemical and biologic phenomena constituting the essence of soil formation. It is evident that the same course must be followed in a synthetic investigation of the role of moisture and heat factors in soil formation, and the main soil classification subdivisions must be treated as the principal object of such an investigation. These subdivisions are the genetic soil types, which, by virtue of the foregoing, will also be the starting point of the following discussion.

The discussion must begin by pointing out that in any of the possible aspects of the study of soils, for example, geographic, genetic or agronomic, the moisture and heat conditions peculiar to the formation of various soils invariably occupy the foreground. Thus, an analysis of the geographic distribution of soils of different genetic types is based first of all on a comparison of the different amounts of radiant heat and atmospheric moisture that enter the soils in different parts of the earth's surface and are measured with the aid of given climatic indices. The main control mechanism regulating the

daily, seasonal and secular changes in properties, i.e., the genesis or dynamics of the various phenomena occurring in the soils, is their water-and-heat regime, which obviously differs qualitatively for different genetic soil types. Finally, the degree of intensity of development of the predominantly biologic phenomena, which depends above all on the heat factor, as well as the exchange of dissolved substances between the plant and the soil, which is regulated mostly by the moisture factor, underly an evaluation of the agronomic properties of the soil, which are known to vary greatly in different genetic soil types.

Hence, it is quite natural that in all these major trends of soil research - geographic, genetic and agronomic - the moisture and heat conditions of soil distribution, the temperature and water regime of soil formation, the heat reserves and the forms of moisture in the soil have long been the object of special study. Each of these trends has been able to accumulate a certain number of basic facts, worked out its own methods and formulated definite ideas about the problem under study.

However it sometimes happens that, in spite of the single physical nature of the phenomena to be investigated, they are studied separately and in isolation within the framework of each of these methodological approaches; the study of these phenomena therefore results in varying amounts of accumulated facts and in little conceptual agreement. Hence, one of the most timely tasks in this theoretical problem of soil science is the internal reconciliation and generalization of the accumulated data and its further utilization for general purposes. The present paper is designed to draw the attention of geographers to this task.

In geographic work on the moisture and heat factors of soil formation, the main approach has been to seek correlation between the geographic distribution of soils belonging to different genetic types and the moisture and heat characteristics of the climates in which these types are formed. In general spirit this approach agrees entirely with the classic tradition of geographic scientific work involving the comparison of spatially variable natural phenomena. Moreover, unlike many other traditional geographic approaches, the study of such correlation has since its inception been placed upon a more or less precise quantitative foundation. However, the main weakness of this approach has been the use, on the one hand, of arbitrary indices of climatic moisture and heat conditions and on the other, of systematic soil subdivisions that are inadequate from a geographic and genetic point of view.

For this reason, the results of the analysis of correlations have become gradually more promising as the arbitrariness of the moisture and heat indices has decreased and the soil subdivisions have been better defined.

The most recent research done in the USSR on the general geographic problem of the water-and-heat balance of the earth's surface and its role in the dynamics of contemporaneous natural phenomena (we have in mind the latest joint studies by Academician A. A. Grigor'yev and M. I. Budyko on the effect of climatic conditons on physical-geographic phenomena, and the studies by M. I. Budyko on the heat balance of the

earth) has uncovered improved (in the physical sense) general indices of the water-and-heat regime of the earth's surface and permits us to apply some of these indices in the study of correlations between soil and climate. (This work was performed by G. Pogodina in consultation with M. I. Budyko.)

Thus, the sum of temperatures of the active surface, computed for the period with air temperatures above 10 °C., and the aridity index can be used as basic indices characterizing the moisture and heat conditions of the climate that affect soil formation.

(M. I. Budyko's studies point to the close connection between the radiation balance of the earth's surface and the sum of temperatures of the active surface during the growing season (computed for air temperatures above 10 °C.). By active surface is meant the natural surface of the soil with its plant cover. Budyko also establishes a relationship between the radiation balance of the earth's surface and the complex evaporability (evaporability taking account of the effect of temperature, humidity and the radiation balance). The complex evaporability is approximately proportional to the magnitude of the radiation balance and corresponds on the average to its value divided by the latent heat of vaporization. The aridity index, also proposed by Budyko, represents the ratio of the complex evaporability to the annual precipitation.)

The study used the data on the sum of temperatures of the active surface computed for the USSR and foreign countries by N. A. Yefimova and L. I. Zubenok and the dryness index computed by D. I. Zubenok. The points on the earth's surface for which the sum of temperatures and the aridity index are known were entered on the soil map of the USSR at a scale of 1:4,000,000 and on the world soil map at 1:50,000,000. Then the respective indices were plotted on a rectangular system of coordinates: the data on the temperature of the active surface in degrees C. along the axis of ordinates, and the data on the aridity index along the axis of abscissas. Each soil type distinguished on the map and characterized by these data was given its definite position on the graph. In this way two synoptic graphs were constructed, showing the moisture and heat characteristics of the main soil types of the world and of the European part of the USSR.

As may be seen from the diagrams presented with the paper (not available- Editor, S. G.) each soil type is characterized by definite values of the aridity index and of the sum of temperatures of the active surface. If we distinguish the fields of distribution of any given soil shown on the graph (that is, if we determine the amplitude of the respective indices, enclosing them with a common contour), we find that such fields will be rather strictly isolated from one another. This produces a result not obtained earlier with such definiteness. It enables us to characterize the moisture and heat conditions of the formation of the main genetic soil types of the world and of the USSR as shown in Tables1 and 2 (Pages 6 and 7).

Table 1

Moisture and heat indices of the world's main genetic soil types

Heat conditions of warm period of year - sum of temperatures of active surface	Moisture conditions - dryness index: Excessively moist Less than 0.50	Moist 0.50-1.00	Moderately insufficient moisture 1.00-1.70	Insufficient moisture 1.70-2.50	Extremely deficient moisture more than 2.50
Cold up to 1,000°	Tundra soils				
Moderately warm a) 1,000-2,000°		Podsol soils of northern and middle tayga			
b) 2,000-2,800°		Turf-podsol soils of southern tayga			
Warm 2,800-5,000°		Brown forest soils of broad-leaf forests	Chernozems of steppes	Chestnut soils of dry steppes	
Very warm					
Very warm a) 5,000-8,000°		Red-earths, yellow-earths of moist subtropical forests	Cinnamon-brown soils of dry subtropical forests -- Reddish-black soils of subtropical forests		Gray-cinnamon-brown soils and gray-earths of subtropical steppes and semideserts
b) 8,000-11,000°		Laterites of equatorial tropical forests	Red soils of tall-grass tropical savannas	Red-cinnamon-brown soils of dry subtropical forests	Red-brown soils of steppelike and desert-like tropical savannas

Table 2

Moisture and heat indices of the main genetic soil types of the European part of the USSR

Heat conditions of warm period of year - sum of temperatures of active surface	Moisture conditions - dryness index: Excessively moist Less than 0.50	Moist 0.50-0.80	Optimal moisture 0.80-1.00	Moderately deficient moisture 1.00-1.70	Insufficient moisture 1.70-2.50
Cold					
500 to 1,000°	Tundra soils				
Moderately warm:					
a) 1,000 -2,000°		Podsol soils of northern and middle tayga			
b) 2,000-2,7000°		Turf-podsol soils			
Warm:					
a) 2,600-3,000°			Gray forest soils		
b) 3,000-4,500°				Chernozems of the steppes	
c) 3,400-4,500°					Chestnut soils of the dry steppes

The genetic approach to the problem under discussion uses mainly the method of direct observation to determine the moisture and heat conditions of the physical, chemical and biologic processes occurring in soils belonging to the different genetic types. This approach has accumulated, especially in the last few years, valuable data from field observations and has formulated a number of theoretical concepts of an inductive or deductive character. The main weakness of this trend is the still inadequate volume and systemization of the field-observation data, which, first, throws an unequal light on the different aspects of moisture and heat changes in the soils and, second, is still far from covering all main genetic types. Soil science therefore still lacks sufficiently complete and well-founded concepts of the water-and-heat regime of the various genetic soil types and other systematic subdivisions that would be based on direct observation data. This general conclusion may be illustrated as follows:

The groundwork for scientific study of the heat regime of soils and its typing was laid by A. I. Voyeykov. In a special study the celebrated Russian climatologist defined three principal types of annual heat regimes of soils, depending on their geographic location:

1. Solar or heating type;
2. Radiating or cooling type;
3. Type with even heat distribution.

For the first type (that is, solar or heating), Voyeykov considered it most characteristic that on the yearly average the temperatures on the surface of the soil were higher than at all other depths and higher than the average annual temperature of the surface layer of the air. This type, in Voyeykov's opinion, is typical of dry temperate, subtropical and tropical areas and, consequently, the soils of steppe or savanna origin.

The radiating or cooling type("snowy") is characterized by the fact that the mean annual temperature of the soil surface is colder than that of the underlying horizons, i.e., the mean annual temperature of the soil gradually increases with depth. Voyeykov considered this type of thermal regime of soils typical of areas with an especially long winter, i.e., particularly soils of continental (boreal) forest origin.

The type with an even heat distribution, in Voyeykov's opinion, is characteristic of "damp localities with abundant precipitation in the middle latitudes," that is, soils of maritime (Atlantic) forest origin.

The distinction of only three types of thermal regime, made by Voyeykov, represents of course only a most general scheme. It tries to show only the most obvious tendencies in the annual thermal regime of soils and is founded on average indices that tend to even out seasonal and other differences of the thermal regimes. In spite of this, Voyeykov's scheme is of outstanding interest as the first, though largely deductive, attempt at a scientific generalization of data on the thermal regime of soils.

As may be seen, this scheme proceeds from the proposition that the heat regime of soils is determined, in the first place, by the balance between absorption of radiant energy and heat radiation (i.e., the radiation balance of the earth's surface). Of lesser importance - because they do not change the main features of the thermal regime, but only complicate them - are the processes of the release or absorption of heat energy that are peculiar to soil formation and occur in various processes of a physical, chemical or biological character, as well as the heat exchange between the soil and the underlying layers of the ground.

Unfortunately, the task set by Voyeykov, of studying and typing the thermal regime of soils, did not attract much attention and, for this reason, was not subjected to further theoretical treatment.

The now unsatisfactory state of the problem of the thermal regime of soils becomes especially clear when compared with the study of the water regime. It is known that the scientific starting point for the treatment of the latter problem was set by G. N. Vysotskiy. More than 30 years ago, he proposed the distinction of four main types of water regime of soils: permacide or leached; impermacide or unleached; exudational or sweated; and stagnant-water.

In contrast to Voyeykov's scheme of thermal regimes of soils, the types of water regime proposed by Vysotskiy have not been forgotten. On the contrary, his water-regime types underwent further fundamental development, principally through the work of A. A. Rode, who not only defined more detailed types, but also determined the essence of the physical phenomena peculiar to the various types. Of the greatest significance in this respect was the identification of various forms (categories) of moisture in the soils and of a system of physical constants characterizing the water properties of soils.

Through special field observations and experiments, and analysis of available data, Rode and his associates confirmed Vysotskiy's types of water regime and distinguished five main types (permafrost, leached and periodically leached, unleached, exudational and irrigational) and a large number of subtypes. In a paper read before the last International Congress of Soil Scientists (in 1956) Rode distinguished 14 subtypes for the three principal types of regimes, giving each of them a definite characterization.

There is no need in this paper to characterize in detail the system proposed by Rode, but it is important to note its basic characteristics. They are as follows: in distinguishing types, account is taken of the total balance of moisture circulation (infiltration: evaporation- desuction,the degree to which it embraces the soil layer and the general direction of movement of soil water; in distinguishing subtypes: the sources of feeding, the presence or absence of internal runoff, the forms of moisture, and the seasonal characteristics of the water regime.

From the foregoing it follows that there is considerable difference in progress toward solving the problems of typing the thermal and water regimes of soils within the framework of the genetic (dynamic) approach to soil research. The solution of the latter is far ahead of solution of the former. There is, however, still another important gap in the posing of the scientific questions under discussion, namely their largely isolated study. As a conventional analytical procedure, a separate approach to the study of the heat and water regime is probably appropriate up to a certain point. But it is quite clear that in nature, in the dynamics of natural processes, the heat and water regimes of soils are profoundly interrelated and mutually conditioned. At a certain stage in the scientific study of both regimes, obviously as early as possible, it should therefore beome necessary to study them together. Unfortunately this is still not done to a sufficient degree.

In the agronomic approach to the study of the moisture and heat factors of soil fertility, there is still, in our opinion, a prevalence of the largely empirical method, which even departs from the principles of the genetic approach to soils, i.e., from the study of soils as integral genetic units. It manifests itself both in the solution of agrogeographic and agrogenetic questions and, to a still greater degree, in that of agrotechnical questions. The responsibility for this situation, however, should not be laid to the school under discussion: it has been obliged to use empirical methods and concepts in view of the weakness of theory in geographic and dynamic soil science and their insufficient tie-in with the agronomic approach.

Yet it is known that a tremendous body of factual data has been accumulated in the agronomic sciences regarding the moisture and heat factors of soil fertility; these results of field observations and experiments have been more or less utilized for establishing interesting and valuable empirical relationships.

This concludes the present paper, the purpose of which was to give a brief review of the present state of the question of the moisture and heat factors of soil formation. It pointed out at the beginning that because of the existence in soil science of various isolated approaches to this question, its present state is characterized by a number of substantial defects. For this reason we regard it as one of the most timely tasks of soil science to bring about an internal reconciliation and generalization of the accumulated scientific data on the question under discussion and its subsequent broad utilization by other sciences and for general scientific purposes. This conclusion seems to us sufficiently well founded in view of what has been set forth above. We might, however, supplement that conclusion by listing the immediate and more concrete tasks that should be set before soil science in the study of the moisture and heat factors of soil formation. These tasks, in our opinion, are the following:

In the geographic approach, the search should be continued for even more representati ve (in the physical sense) indices of the moisture and heat conditions of soil formation, use should be made of soil data that are more

precise from a geographic and genetic point of view, and the sphere of the study of correlations between climatic conditions and soil properties should be expanded.

A gradual transition should be made from the analysis of general geographic laws, at the level of belts and zones, to local (provincial and regional) laws. It is evident that, in the latter case, we will have to deal largely with microclimates and local soil varieties.

In the genetic approach to the study of moisture and heat factors of soil formation, we should, as soon as possible, tighten up the scientific generalization of data on the thermal regime of soils and its typing, as well as develop work on soil climates, basing such study on an analysis of the water-and-heat regime as the key to all other soil and climate phenomena.

In the course of such work we should try to synthesize the general concepts of soil genesis, expressed in systematization and classification, with an investigation of their water and heat dynamics. For this purpose, it would be important to carry out, at a number of key points with well-known representative soil conditions, a whole cycle of scientific analyses of the water-and-heat regime (on a balance basis), tying in the data obtained with the general indices of the moisture and heat conditions of climate. Such an investigation will make it possible to establish a direct link between the geographic and genetic approaches by offering an opportunity for discovering the physical essence of the correlations between the general climatic indices, the genetic soil types and the concrete types of water-and-heat regime peculiar to them. It is quite clear that this task is necessary at the present time.

We shall not touch in this paper on the concrete tasks and questions that remain to be solved through the agronomic approach to the study of moisture and heat factors of soil formation. Such tasks and questions arise in the course of agricultural work and hence depend upon many different conditions. It should only be stressed that, in working out such questions, thorough use must be made of the results of theoretical geographic and genetic research. It is even more important that the character of the practical questions brought up in the agronomic approach should steer theoretical work in geographic and genetic schools: such a link of the agronomic trend with the others is suggested by the very organization of the work and by the available factual data.

It was pointed out above that the scientific analysis and synthesis of the accumulated data and the consolidation of the various approaches to the study of moisture and heat factors of soil formation should be done by the soil scientists themselves. This proposal is quite natural. However, it can be successfully implemented only with the broadest cooperation among the specialists of adjacent scientific disciplines, especially climatologists and hydrologists. It may be confidently said that such support will not be in vain; it will probably generously repay itself not only in the interest of the scientific disciplines cognate with soil science but, what is most important, will redound to the benefit of the ancestor of all geographic disciplines, i.e., general physical geography.

References

1. Agroklimaticheskiye i vodnyye resursy rayonov osvoyeniya tselinnykh i zalezhnykh zemel' (Agroclimatic and Water Resources of the Areas of Development of Virgin and Idle Lands). Gidrometeoizdat, 1955.
2. Bol'shakov, A. F. "On the heat regime of soils," Problemy sov. pochv., No. 12, 1941.
3. Budyko, M. I. "Study of the heat balance of the earth's surface," Izv. AN SSSR, seriya geogr., 1956, No. 6.
4. Verigo, S. A. "The dynamics of the reserves of soil moisture on the territory of the USSR," Trudy po s-kh. meteorologii, No. XXVI, 1948.
5. Voyeykov, A. I. "The temperature of the soil and waters," in the book: Polnaya entsiklopedlya russkogo s-kh. i soprikasayushchikhsya s nim nauk (Complete Encyclopedia of Russian Agriculture and Associated Sciences). Vol. IX, St. Petersburg, 1905.
6. Vysotskiy, G. N. "Essays on the soil and regime of ground waters," Byulleten' pochvoveda, 1927, No. 5-8.
7. (Item 7 is missing in original)
8. Grigor'yev, A. A., and Budyko, M. I. "On the periodic law of geographic zonality," Doklady AN SSSR, 1956.
9. Dokuchayev, V. V. Nashi stepi prezhde i teper' (Our Steppes Before and Now). St. Petersburg, 1892.
10. Zakharov, S. A. Kurs pochvovedeniya (Course in Soil Science), Moscow-Leningrad, 1927.
11. Kachinskiy, N. A. "The freezing, thawing and humidity of the soil in winter in the forest and on field plots," SGU, 1927, Trudy Nil pochvoved. pri fiz-mat. I Mosk. ped. in-ta.
12. Koloskov, P. I. "Agroclimatic Regionalization of Kazakhstan," Izv. AN SSSR, 1947.
13. Koloskov, P. I. "Agroclimatology as a new Soviet scientific discipline," Izv. AN SSSR, ser. geogr. i geof., 1946, No. 2.
14. Koloskov, P. I. "Soil climatology," Pochvovedeniye, No.3, 1946.
15. Neustruyev, S. S. Elementy geografii pochv (Elements of the Geography of Soils). Sel'khozgiz, Moscow-Leningrad, 1931.
16. Perunova, M. S. Klimat SSSR (The Climate of the USSR), Part VI: "Temperature of the soils of the USSR", 1952.
17. Rode, A. A. "The water regime of soils and its types," Doklady VI Mezhdunarod. kongressu pochvovedov (Proceedings of the 6th International Congress of Soil Scientists). First Commission, 1956.
18. Rode, A. A. Pochvovedeniye (Soil Science). 1955.
19. Khrgian, A. "Soil temperature and climate," Meteorol. i gidrol., No. 7, 1937.
20. Shul'gin, A. M. "The climate of the soils of the European part of the USSR in relation to soil zonality," Izv. AN SSSR, seriya geogr., No. 6, 1955.
21. Shul'gin, A. M. "Present tasks of the study of the climate of soils in the light of Dokuchayev's and Vil'yamps' ideas," Pochvovedeniye, No. 10. 1949.
22. Jenny, Faktory pochvoobrazovaniya (Factors of Soil Formation)

THE PLACE OF REGIONAL ECONOMIC GEOGRAPHY IN THE SYSTEM OF GEOGRAPHICAL SCIENCES

By V. V. Pokshishevskiy

(From Izvestiya Akademii Nauk SSSR, seriya geograficheskaya, 1960, No. 5, Pages 124-132)

(Abstract: The author holds that regional geography cannot be regarded as an independent geographic discipline because it lacks its own system of laws, such as the natural laws that operate in physical geography and the social laws that operate in economic geography. He agrees with the view that both physical and economic geography fall into theoretical and regional departments, and that regional studies test the localized application of the general laws formulated by the theoretical departments of the two great divisions of geography.)

The purpose of the present article is: (1) to establish whether regional geography (stranovedeniye) should be regarded as an independent geographic discipline or merely a specific approach (or method) in geography; (2) to determine whether regional geography must be divided into physical and economic; (3) to determine the interrelationship between regional economic geography and economic geography.

The term "regional geography" was long virtually unknown in Soviet scientific usage. (It was used now and then as a simplified colloquial expression, and only rarely to designate a subject of instruction. It is characteristic that the term is missing from the first edition of the Great Soviet Encyclopedia. The second edition, published in 1956, gives a brief definition open to various interpretations.) Not until after World War II was the term introduced into circulation by N. N. Baranskiy (1946). It was "legalized" in 1954 as a heading in the geography abstracts journal (Referativnyy zhurnal-Geografiya) and began to figure in some articles, for example, one by V. A. Anuchin (1955). At the Second Congress of the Geographical Society of the USSR, Academician I. P. Gerasimov thought it appropriate, in designating certain types of studies, to mention "regional physical geography" and "regional studies of an economic-geographic character" (Gerasimov, 1955). ("Alongside a general physical geography or earth science *** we find a regional physical geography concerned with the natural geographic environment within a given part of the earth's surface," from the translation of Gerasimov's article in Soviet Geography, January-February 1960, p. 6). The term was later used with the same intent by E. M. Murzayev (1957), S. N. Ryazantsev (1957), S. V. Kalesnik (1959) and others. However, it is not always being given the same meaning. To clarify this question it is useful for us to recall the history of certain general scientific geographic concepts.

As early as the first half of the 19th century, the designation of our

science as "geography," in the primitive sense of "earth description," which had led to a nomenclatural and informational approach to the subject, had ceased to satisfy scholars. Richter introduced the term "Erdkunde" and Humboldt greatly broadened the concept of a geographically interrelated complex of natural facts and laws. In Russia, an entirely independent response to that stage of development of the science was provided by P. P. Semenov-Tyan-Shanskiy's views, which he summed up in the form of an essay on the content of the various interrelated geographic disciplines, designated in their totality as "earth science" (Semenov, 1896). It was also he who introduced the concept of "particular earth science," having the same content but being limited areally to a country or region. (Semenov's "particular earth science" -- chastnoye zemlevedeniye -- is essentially what the Germans began to call "Länderkunde" and what the Anglo-American literature refers to as "regional geography." These terms are still used abroad, being equivalent to the Russian stranovedeniye, without an adjective.)

Further interrelationships between general and particular earth science are most easily traced in physical geographic studies. These studies followed two main schools. The first, based broadly on the natural sciences adjacent to geography, sought to uncover geographic aspects of the laws formulated by those sciences. For a long time this school did not realize its capabilities: the laws that were to make up the content of the central pillar of physical geography were formulated outside of it, and although they were formally expounded within the framework of general geography, the latter continued to look like a foster mother of "adopted children." It is no accident that geography at that time gained the reputation of a scientific discipline with unlimited content - a compilation of diverse bits of knowledge about the earth. Only gradually, as geography became infused with accidentalist materialism, linked with the names of such great scholars as A. I. Voyeykov, V. V. Dokuchayev and,later, D. N. Anuchin and L. S. Berg, did the general school of geography begin to grope toward its independent object. This process was greatly speeded after the Great October Socialist Revolution when Soviet geographers began to base themselves consciously on the tenets of dialectic materialism. The principles of both the demarcation and the cooperation between general physical geography and the supporting natural and particular geographic sciences were gradually found. The general object of geography has been defined as "the geographic environment" or "the geographic envelope" of the earth, in the study of which physical geography has begun to collaborate with geophysics. The quantitative-balance methods introduced into geography have gained increasing significance. The Soviet general earth science school already has its clearly defined problems, such as the leading problem of the study of the water-and-heat balance of the earth's surface.

As regards particular earth science, it, too, was for a number of decades an aggregate of concrete information about individual parts of the earth (not infrequently including man and his economy), for the systematization of which only the principle of territorial groupings was used. This school, represented in Russia by Petri, for example, existed for a long time as a subject of

instruction rather than as a science with its own content. The decline of general geography around the end of the 19th century became especially profound when Hettner in Germany created a philosophical concept setting the so-called chorological sciences apart as a special group. Geography appeared to him to be the study of everything that fills the "chores" or units of space; in spite of some qualifications, this concept metaphysically opposed space to time, excluded (or greatly limited) any ideas of development, and replaced causal relationships by a study of the spatial coincidence of individual elements filling the "chores." The chorological concept exerted (and continues to exert) great influence upon geography outside of the Soviet Union, giving rise to various idealistic concepts of the arbitrary ("reasoned") construction of regions and denying the objective existence of regions. In the United States, for example, this position is held by many geographers of the Hartshorne school, particularly Ackerman (1958); the same point of view is expressed in Amerikanskaya geografiya (1957).

(Ackerman's study is very illuminating. With a great deal of scientific honesty he exposes the acuteness of the methodological crisis into which chorology has led bourgeois geography; and yet, the neo-Kantian philosophical premises from which he proceeds do not allow him to break away from the chorological point of view. It is curious how he tries to modernize the Hettnerian concept of the filling of "chores" or spaces: first, he turns to the map as the practical expression of the chorological principle; but since objects must always be consciously selected in the compilation of a map, and since such a selection is based on a specific approach to the geographic "essence" of phenomena, he seizes upon the aerial photograph, in which the camera lens has supposedly caught everything without distinction within the field of vision. Ackerman overlooks the fact that the interpretation of aerial photographs is an important scientific operation that also requires a specific understanding of the geographic nature of the photographed objects.)

Soviet geography's critical overcoming of the influence of the chorological concept was based mainly on the fact that attention was redirected to the material essence of the studied phenomena, and that these phenomena were studied not only in space but in time. "The world contains nothing but moving matter, and moving matter cannot move otherwise than in space and in time" (V. I. Lenin, Works, Vol. XIII, p. 144, 3rd edition). Lenin's statement furnished the foundation for Soviet materialistic geography. The subdivision of geography into individual disciplines was naturally subordinated to the specific forms of motion of matter from which Engels derived his classification of the sciences.

The determination of these specific forms proceeded mainly along the lines of the differences upon which the character of the laws under study depended, natural in some cases, social in others. This question has already been sufficiently discussed in the methodological literature, most recently by S. V. Kalesnik (1959). It should be noted that, while pointing out the dissimilarity between the laws of development of nature and of society, all the authors stress the need for integrating physical and economic geographic

studies (for example, Gerasimov, 1955, and Sun Ch'ing-chi, 1959). It might have been expected that the so-called Soviet regional school, which has insistently proclaimed the importance of demonstrating a wide range of spatial relationships and has done much to develop methods for the integrated characterization of individual areas, would under these conditions become the basis for the development of a scientific trend combining, within the framework of a given area, the study of the geographic processes of development of both natural and social phenomena. Actually all the more successful studies of the "regional school" have been done "under the jurisdiction" of either physical or economic geography. (Examples of such studies are, on the one hand, N. N. Mikhaylov's Sibir' (in several editions) or N. A. Gvozdetskiy's Fizicheskaya geografiya Kavkaza (Physical Geography of the Caucasus) and, on the other hand, Yu. G. Saushkin's Moskva (in several editions), several of A. N. Rakitnikov's studies on the agriculture of the Caspian region, or the valuable symposium on the geography of the building industry, published in 1958.) "Regionalism" in itself thus does not by any means create a "unified geography" with a regional emphasis (the reasons for that will be discussed below). Moreover, authoritative followers of that school have said that regional geography is an applied discipline (in some cases one that is essential in practical work), but by no means an independent science, "merely an organizational form of combining diversified knowledge about a given region" (Baranskiy, 1946). Statements such as these, while emphasizing the practical value of regional geography, have at the same time objectively compromised it as a scientific discipline.

(It should also be borne in mind that because of strong attacks by several economic geographers who, from our point of view, have treated in a one-sided fashion the tenets of dialectic materialism regarding the general and the particular, the regional school has limited itself mainly to the study of small areas, from which it is difficult to make broad generalizations. It was largely because of this that the regional school, taken as a whole, has essentially shied away from working out the methodological foundations of regional geography as a scientific discipline in geography.)

The dispute over the legitimateness of the regional approach (specializing in the study of countries and regions) in economic geography revolved for a long time around the relationship between the general and the particular. Typical of the early 1950's was an article by Ya. G. Feygin (1951) discussing the question of what economic geography should be concerned with -- the establishing of general laws or the uncovering of localized specific features. It seems to us that it is not legitimate to oppose the two ideas. The general and the particular should not be put in opposition to each other. To use Lenin's words, "the general exists only in the individual, only through the individual. Any individual is (in one way or another) general. Anything general is a particle (or an aspect, or an essence) of the individual" V. I. Lenin, Filosofskiye tetradi (Philosophical Notebooks), Moscow, 1947, p. 32). The entire practical experience of geography clearly shows that it would be wrong to shy away from an analysis of actual geographical relationships over their entire multi-level taxonomic range. It is impossible

to deny the objective existence of any of the territorial complexes that must be regarded as a subject for scientific regional study. Moreover, the practical tasks of development of a Socialist economy increasingly underscore the importance of uncovering local natural and economic characteristics, the overlooking of which may lead to many errors in planning.

The objections to regional (territorially limited) studies thus disappear. The sobering that set in after voluntaristic attempts to "push" economic geography into a Procrustean bed of merely general laws, ignoring local peculiarities, has been followed by more realistic attention to these peculiarities. Merely the accumulation of factual information about these peculiarities, for which there seemed to be a call (against the author's wishes) in some of N. N. Baranskiy's writings (1946, 1950), could not in itself satisfy the practical requirements: there was need for scientific principles of analysis of these peculiarities and for ascertaining laws governing their manifestation. In studies relating to the transformation of nature and the economy there is a special need for uncovering regular relationships to show how in a given (regional) context changes in any of the elements affect the entire complex.

Thus one of the "controversies" that figured for a long time (in our view, quite illegitimately) in the disputes over the essence and tasks of economic geography received an entirely clear solution that at the same time "justified" regional research. The economic processes that are governed by the general economic laws of the given mode of production, including the laws of distribution, are given a concrete regional expression. If we are to understand a region, we must know the general economic laws that have shaped the economic personality of that region. But the study of general laws requires that they be understood in their concrete manifestation -- otherwise we just have a bare abstraction. Just as the philosophic concept of motion cannot be separated from moving matter, so the forces determining distribution do not exist "of and by themselves," but only as applied to concrete economic phenomena developing in time and in space.

Examples of how we should study regional manifestations of general economic laws are offered by Lenin's writings. They include, for example, in Razvitiye kapitalizma v Rossii (The Development of Capitalism in Russia), the analysis of regional specialization of agriculture as a manifestation of the growth of commercial farming; the description of the conditions of development of capitalism "in depth and in breadth," which is very important from an economic-geographic point of view. Another example of this kind of analysis of general laws that is not abstract but completely down-to-earth is provided by the discussion of the regional characteristics of the United States economy in Lenin's book Novyye dannyye o zakonakh razvitiya kapitalizma v zemledelii (New Data on the Laws of Development of Capitalism in Agriculture).

One of the cardinal problems of development of regional geography in the USSR is the problem of the possibility of treating questions of physical and economic geography within the framework of a "unified science." It should

be noted that the very concept of "unified science" seems to us somewhat metaphysical and to lead away from the dialectic notions of the process of cognition. The "movement of ideas" must reflect a "movement of matter" and the specific features of any cognition may be derived first of all from the form of the movement of matter. From this point of view it is difficult to defend the unity of geography on a philosophical plane by reference to a category such as space (territorial framework, region), which is inseparable from movement itself. It would be easier to speak of a unity (but quite a different kind!) based on the dialectic method of cognition of phenomena -- from the point of view of their development. Marx and Engels did in fact speak of such a unity: "We know only of one unified science, the science of history. If we view history from two sides, it can be divided into the history of nature and the history of man. However both aspects are inseparably connected: inasmuch as man exists, the history of nature and the history of man mutually determine each other" (Marx and Engels, Works, Vol. IV, 1933, p. 8). This quotation points to the real connections between nature and society. These connections exist, of course, and are very important for economic geography, as well as for physical geography (to the extent that the latter is concerned with the natural environment undergoing man's action). From our point of view, it is these connections in their concrete manifestations that determine to what extent economic geography should employ physical geographic data (and vice versa). It seems to us that such employment should be extensive in view of the diversity and the degree of influence of the natural environment on society. (*) Nevertheless the basic complex of interrelations is so clearly outlined as part of the research subjects connected in one case with social laws, and in other cases with natural laws, that to confuse them would mean running counter to the criteria of practical work. (**)

(*) (We see a great deal of merit and realism in N. N. Kolosovskiy's call for study of the technical link that ties man and nature closely to each other in any area (Kolosovskiy 1947, 1955). Some economic geographers have repeatedly accused Kolosovskiy of excessive devotion to "technicism." The sharpness of the polemic that followed has, in our opinion, lured Kolosovskiy, the materialist geographer, onto the shaky ground of erroneous agreement with the thesis of a "unified" geography (and has prevented his opponents from appreciating the profoundly rational kernel of his basic position). It is regrettable that Kolosovskiy's rich scientific heritage has until recently been evaluated very often merely for polemical purposes.)

(**) (In geography abroad the confusion (sometimes euphemistically called "integration") of social and natural laws is often used as a way (conscious or involuntary) of glossing over or acknowledging the "irremovability" of acute social problems. Examples are the biologism of the "ecological" concept of M. Sorre and many statements of modern neo-Malthusian geographers.)

This question has been sufficiently discussed in Soviet geography. That explains the unpopularity of slogans about "unified geography," which are still sometimes advanced with allusions (demagogic, it seems to us) to the philosophical unity of the world. The results of both the Second and the

Third Congress of the Geographical Society of the USSR have shown incidentally that there are few Soviet adherents of "unified geography."

The great majority of Soviet geographers firmly support the opposite concept of a separateness of physical and economic geography in view of the substantial differences in the nature of the laws (natural and social) operating in each of these sciences and in view of the differences in the ways of studying these laws.

Thus there has been evolved in physical geography, and raised to new heights in Soviet times, a "division of labor" and a creative interaction between general earth science, on the one hand, and the specialized geographic disciplines dealing with individual components of the natural environment, on the other as well as between general earth science and integrated physical geographic research; in economic geography, too, all the premises exist for successful interaction between the study of general economic processes and their localized (regional) manifestations; the need for using in economic-geographic work a wide range of physical-geographic data (a need caused by actual relationships often expressed through a technical link) does not create grounds for devising an artificial science of "unified geography."

We are now ready to define the meaning of regional geography. As far as one of the divisions of geography is concerned, this term has already virtually merged with the term "regional physical geography"; in exactly the same way we consider it possible to speak of regional economic-geographic work, whose distinguishing characteristic lies in its regional framework. (A. M. Kolotiyevskiy recently proposed the Russian term rayonovedeniye (regional science), designating studies on an initial descriptive level as rayonografiya and studies on a higher level as rayonologiya (Kolotiyevskiy, 1959).)

Is the regional framework the sole distinguishing mark of regional-geographic work? It seems to us that there are other distinguishing features, making it possible to consider any regional study simply as a part or as a trend of either physical or economic geography. There is first of all the relationship to the establishment of scientific laws. The task of regional studies is in both cases to determine how the laws operate or are modified under given local conditions; the laws themselves are established by the appropriate theoretical departments of the science. S. V. Kalesnik (1959) made the point that we should distinguish a theoretical part and regional departments within each (even each particular) geographical science. The foregoing can be easily illustrated by examples, taken mainly from the field of physical geography, where the system of scientific categories has been better worked out. The laws of vertical zonality of physical-geographic processes as a whole are worked out by general earth science; the laws of zonality of, say, climates are worked out by climatology; regional physical-geographic studies investigate in detail how these laws manifest themselves in the Caucasus, in the mountains of Central Asia, and so forth. The factual data assembled in such regional studies can, of course, exert a "reverse influence" on the theoretical formulation of the laws (an excellent example of such interaction between the

regional and theoretical departments of the science is furnished by Academician A. A. Grigor'yev's work Subarktika), but the general line of demarcation is as follows: the establishment of laws lies outside the province of regional geography, but the interpretation of these laws constitutes the scientific foundation of regional geography. In economic geography, the laws of distribution of production as a whole or by economic segments, established by the theoretical department of the science, are verified in any regional study and are used to explain the regions that are concretely taking shape; the laws are also used in an analysis of the interrelationships between the leading and the "supporting" branches of the regional economy, and so forth. The more detailed the research, the further the particular manifestations of the laws can be traced; for example, down to the interrelations of agricultural specialization on the lands of a collective farm and its distribution of manpower among brigades. In population geography, the general laws relating settlement forms to the territorial organization of production manifest themselves in a multitude of local variations, explaining the concrete combinations of large cities and their satellites, the relation between the density of population and its functions, and so forth.

If it is to rise above the descriptive level, regional geography must have full command of the entire system of relevant laws and must develop its own scientific methodology for applying those laws to regional material (including methods for typing phenomena, uncovering the mechanism of local modifications of laws, etc.); in short, it must create its own "internal" theory.

Regional physical geography should enlist in the analysis of territorially limited objects the sum total of laws established by the particular (specialized) physical-geographic sciences (since all the natural components are "combined" in the territory under study and interact with one another). In a similar manner, regional economic geography is obliged to operate "simultaneously," as it were, with the laws of both the distribution of industry and the formation of the transportation network, etc.; the economic-geographic location of individual objects should be evaluated on the basis of the combined influence of all the factors upon this location, and so forth. In short, the interpretation of the individual laws, when used to explain the concrete pattern of the economic fabric of a region, turns into a synthesis of these laws. The synthesizing character of regional geography constitutes an additional qualitative divide separating it from the theoretical departments of the science, in which the analytical accent will always predominate (and this is quite legitimate).

(As regards the saturation of regional-geography studies with factual data (this is sometimes cited as a characteristic of regional geography), the "dosage" of such data depends on practical requirements and has no fundamental significance. One can imagine studies in which the factual part is reduced to a minimum and those in which it is very extensive. Of course, if the factual material is not explained, the study will cease to be scientific and will be merely a reference work; we are speaking here of scientific regional geography. One should also bear in mind that studies of a non-regional type can also be saturated with factual data in different ways (this applies, for example, to economic-geographic research on specific branches of industry).)

It remains for us to answer the following questions. Inasmuch as both physical-geographic and economic-geographic studies of the regional type have a territorially limited scope, is it not advisable to provide for integration by treating regional monographs from both aspects of a given territory? And if so, does this not mean a return to the idea of "unified geography"?

To the first of these questions we answer: sometimes this is advisable and possible; to the second, we reply in the negative. The union of physical and economic regional geography within a given study may be necessary from a practical angle and can be successful. (This is the type of research that S. V. Kalesnik singles out as a special "mixed discipline" (in which we do not agree with him), combining, in his words, the information gained by the natural and social geographic sciences (Kalesnik, 1959).) However, it is usually necessary for physical and economic geographers to collaborate on such a combined study. In the rare cases in which a single person is qualified to be the author (a classic example is L. S. Berg's book Bessarabiya; strana, lyudi, khozyaystvo (Bessarabia; Country, People and Economy), 1918), he will use physical-geographic research methods in some sections of the book and economic-geographic methods in others; even such an author will, in one of his "aspects," be mainly a skillful and conscientious compiler of specialized studies (in the field from which he is furthest removed). (The present author is able to judge this from his own experience of writing the small book Yakutiya, in which he ventured to give a subtitle similar to that which Berg gave to the above-mentioned book.)

It is also an essential fact that the territorial frameworks of a physical and an economic geographic study can coincide fully only by way of exception (an insular geographic object or an object distinctly detached from neighboring ones: Sakhalin, Kamchatka, the Kola Peninsula). More often, however, the boundaries do not coincide (the Western Siberian Lowland and the Western Siberian economic region, the "physical" and "economic" Urals, and so forth). But even in the first case further internal regionalization -- an essential part of any regional-geography study- - will generally differ. Only for poorly developed territories, where an almost entirely unshaped economy is overwhelmingly dependent on natural conditions, is it possible to expect complete coincidence of the natural and economic regions (in this case there are essentially no economic regions; one can say only that the rudiments of an economy differ "from place to place"); aside from these exceptions, the attempt to construct "combined" natural-economic regions usually yields only a compromise result, arbitrarily accepted for practical purposes, but scientifically incomplete. If we take the major subdivisions of the world, whole continents for example, the non-coincidence of the internal breakdowns (states and natural regions) at once stands out in all its sharpness, even though the outside boundaries clearly coincide. It may seem that this problem is solved if one takes, on the other hand, the smallest units (approaching a point as a limit). However, this is not actually so. The physical geographer will operate here with lower landscape units, the economic geographer with lower economic units. The territory of a collective farm almost never fully coincides with any one of the landscape units.

This non-coincidence cannot be regarded merely as a mechanical obstacle to "unified" regional geography: it profoundly reflects the very essence of the matter, namely the non-coincidence of the material object of the study: those forms of the movement of matter whose difference determines the separate (though interrelated) development of economic and physical geography as independent disciplines.

Institute of Geography
of the Academy of Sciences of the USSR

References

Amerikanskaya geografiya, sovremennoye sostayaniye i perspectivy (American Geography: Inventory and Prospects). Moscow, Izd-vo in. lit., 1957.

Anuchin, V. A. "Concerning theoretical questions of regional geography," Voprosy geografii, No. 37, Moscow, Geografgiz, 1955.

Baranskiy, N. N. "Regional geography, physical and economic geography," Izv. Vsesoyuzn. geogr. o-va, 1946, No. 1.

Baranskiy, N. N. "The geographic principle in the organization of the geographic study of a territory," Voprosy geografii, No. 23, Moscow, Geografgiz, 1950.

Berg, L. S. Bessarabiya; strana, lyudi, khozyaystvo (Bessarabia; Country, People and Economy), Petrograd, Izd-vo OGII, 1918.

Gerasimov, I. P. "The present status and aims of Soviet geography, Izv. AN SSSR, seriya geogr., 1955, No. 3 (See Soviet Geography, January-February 1960, pp. 3-16.)

Kalesnik, S. V. "On the system of geographic sciences," Nauchn. dokl. vyssh. shkoly. Geol. geogr. nauki, 1959, No. 1.

Kolosovskiy, N. N. "The territorial production combination (complex) in Soviet economic geography," Voprosy geografii, No. 6, Moscow, Geografgiz, 1947.

Kolosovskiy, N. N "Scientific problems of geography," Voprosy geografii, No. 37, Moscow, Geografgiz, 1955.

Kolotiyevskiy, A. M. "The place of landscape science and economic-geographic regional science in the system of geographic sciences and the foundations of their interrelations," Uchen. zap. Latviyskogo Gos. un-ta, Vol. 31, No. 3, Riga, 1959.

Murzayev, E. M. "Results and tasks of physical regional geography," Izv. AN SSSR, seriya geogr., 1957, No. 5. (See Soviet Geography, January-February 1960, pp. 21-28.)

Ryazantsev, S. N. "Results and tasks of studies in regional economic-geography at the Institute of Geography of the Academy of Sciences of the USSR," Izv. AN SSSR, seriya geogr., 1957, No. 5. (See Soviet Geography, January-February 1960, pp. 33-40.)

Semenov (Tyan-Shanskiy), P. P. Istoriya poluvekovoy deyatel'nosti Imperatorskogo Russkogo Geograficheskogo obshchestva (History of a Half-Century's Activity of the Imperial Russian Geographical Society), Ch. I, St. Petersburg, 1896.

Sun Ch'ing-chi. Ekonomicheskaya geografiya kak nauka (Economic Geography as a Science), Moscow, Geografgiz, 1959.
Feygin, Ya. G. "On the subject and tasks of economic geography," Voprosy filosofii, 1951, No. 6.
Ackerman, E. A. Geography as a Fundamental Research Discipline, Chicago, 1958.

THE MOSCOW BRANCH OF THE GEOGRAPHICAL SOCIETY OF THE USSR IN THE NEXT FEW YEARS

By Yu. K. Yefremov

(From Izvestiya Akademii Nauk SSSR, seriya geograficheskaya, 1960, No. 6, Pages 122-25)

(Abstract: This survey of the program of activities of the Moscow Branch includes a list of topics suggested for discussion at meetings of geographers and a detailed program of activities for the dissemination of geographical knowledge through lectures, publications, exhibits, excursions, radio-television, photographs and films, and library services.)

The members of the Council of the Moscow Branch of the Geographical Society of the USSR were re-elected in the middle of 1960. At the same time a general meeting of the Society members of the Moscow Branch approved the basic outline of a work program, a kind of directive to the new officers and to all sections, departments and commissions of the branch for the new term.

The activities of the Moscow Branch, as a component part of the Geographical Society of the USSR, will be designed to mobilize the efforts of the community for fulfillment of the decisions of the 21st party congress regarding the seven-year plan of development of the national economy, to work out long-range development plans and to expand the dissemination of geographical knowledge.

The activities will be coordinated with implementation of the resolutions of the Third Congress of the Geographical Society of the USSR. One of the principal tasks of the branch, in the light of those resolutions, is to expand the sphere of activities of the organizations of the Society, to strengthen its mass character, and to attract new members from among teachers, local scholars and production people. An important task in this connection will be to assist the home-area study movement; home-area study commissions should be established within the operating sections of the Society, old commissions should be revived and new home-area study personnel should be trained.

The Geographical Society today is mainly a platform for the exchange

of opinion and experience and for the dissemination of geographical knowledge; it is a body for inter-departmental coordination of plans, methods and conclusions.

It is therefore important for the Society as a whole and its Moscow Branch to make timely and purposeful use of that platform, to insure the topical character of the problems and topics of papers, and their high scientific level and practical value. With a view to facilitating the planning of activities in sections, departments and commissions, the Council of the Moscow Branch recommended the following topics as the principal subjects for discussion at meetings(the Moscow Branch directs the activities of sections and cells of the Society in 19 oblasts of central European Russia; the departments and commissions are structural subdivisions within the Moscow Branch itself):

Questions relating to the theory and methodology of geography as a whole and of individual geographical sciences;

Problems of distribution of productive forces, general and inter-oblast economic regionalization, inter-regional and intra-regional industrial subcontracting, participation of geographers in long-range economic planning;

Study of the physical and economic geography of specific areas, especially of the Central Industrial and the Central Chernozem regions of European Russia;

The contributions that geographers can make in assuring the inventorying, study, conservation, rational development and the renewal of natural resources;

The objectives of physical-geographic research and natural regionalization in the interests of agriculture, including methods of qualitative evaluation of lands and anti-erosion measures;

The objectives of geography in the Socialist organization of areas through the introduction of local planning, work on the transformation of nature and through the solution of integrated national-economic problems;

Questions of the geography and microgeography of population and population centers, and the geography of manpower distribution;

Methods of integrated and special geographic research relating to contract work for economic sectors;

Methods of geographical description and the principles of compiling regional monographs and series, reference books, dictionaries and encyclopedias;

Principles of compiling oblast atlases;

Special-mapping methods;

Questions of higher geographic education and the improvement of geography teaching in middle schools in connection with the public-education reform (teaching methods, the general cultural and polytechnical value of geography as a classroom subject, textbooks and teaching aids in geography);

Presentation of results of recent geographic research, including study of the atmosphere, the oceans of the Arctic and the Antarctic, and the regional geography of the USSR and foreign countries (making wide use of personal impressions of visits to the respective areas);

Study of current principles of geography abroad and critical discussion of these principles, and criticism of pseudo-scientific views of reactionary bourgeois geographers;

Questions of political geography and its tasks in the era of coexistence of the Socialist and capitalist camps, and geographical aspects of the fight for peace and the fight against colonialism;

Questions of organization and methods of dissemination of geographical knowledge and the value of geography in the country's cultural growth;

Ways of stimulating the home-area study movement, its objectives, working methods and achievements; links with hiking and camping organizations and home-area museums;

Reviewing and abstracting of Soviet and foreign publications (both of published books and journals and of manuscripts prepared for the press), discussion of prospectuses and plans for the publication of geographical literature;

History of Russian and Soviet geography and its links with foreign geography; important memorial dates; the history of geographical discoveries and explorations of the world.

The preceding list of topics may appear to be too all-inclusive and excessively broad. But it is not intended necessarily to be covered in its entirety. Sections, departments and commissions will be able to select topics of the greatest current interest and those corresponding to the interests and specialization of members. Furthermore the list omits many specialized problems that fall within the province of specific departments and commissions. It is up to the individual units of the Society to include such problems within their programs of activities.

The presentation of papers and their discussion has long been the predominant form of activity of the organizations of the Moscow Branch. In the last two years the Moscow geographers have renewed their efforts to find new and more diversified forms of activities. Some of these experiments have been successful, making it possible to recommend their use in the future. They include, for example, the activities of specialized study groups and seminars; interdepartmental meetings; meetings held at industrial plants, educational institutions, clubs and libraries; public discussion of books, manuscripts, journals, publication plans; organization of exhibits, excursions and field trips; collective work on dictionaries, atlases and home-area symposia; use of films, radio and so forth.

The sections, departments and commissions are urged to develop and expand ties with scientific and economic organizations, especially with planning authorities, regional economic councils, mapping agencies, agricultural and forestry agencies and other scientific and mass-participation societies (for example, the Society for the Conservation of Nature).

In the light of the resolution of the party's Central Committee on "The Tasks of Party Propaganda Under the New Conditions," dated January 9, 1960, increasing importance is being attached to the dissemination of geographical knowledge, which can and must become one of the key elements in the Communist indoctrination of the working people and a component part of the struggle for successful implementation of the seven-year plan and of

the entire program of full-fledged construction of communism. Improvement in the dissemination of geographical knowledge, an increase in its efficacy, concreteness and its links with practical work should therefore become one of the principal objectives of the Moscow Branch and its subdivisions in the next few years.

Guided by the spirit of the party resolution, the Council of the Moscow Branch urged the branch and its sections to make use of diversified forms of dissemination of geographical knowledge: lectures, publications, exhibits, excursions, radio-television, photographs and films and library activities.

Under the heading of lectures, it urged: the organization of lecture halls at the sections of the Society or in other institutions, such as clubs, schools or factories; providing lectures and conferences to various production and public groups at the expense of local party units and public organizations; participation in lecture activities of related scientific and mass-participation societies.

In developing publishing forms of the dissemination of geographical knowledge, effective steps should be taken to raise the topical level and practical orientation of scientific studies and symposia published by the branch or its sections, to improve the quality of writing and editing, and to improve the availability of published materials to a wider circle of readers. It is extremely important that information be made available regarding all geographical literature, published or planned for publication in central and local publishing houses, in order to promote inquiries, and thus the circulation of geographical publications. There still is not a sufficiently permanent and close relationship with book dealers, who up to now have been getting few orders for publications that are in press.

An important form of publishing activity continues to be the publication by the Branch of the serial Voprosy geografii. 1960 was a kind of anniversary year for the series as No. 50, devoted to historical geography, was published. The following volumes are planned:

No. 51 - Moscow and its environs;
No. 52 - Applied geomorphology;
No. 53 - Foreign countries (marking the 70th birthday of I. A. Vitver);
No. 54 - Geography and the use of land resources;
No. 55 - Natural and agricultural regionalization;
No. 56 - The geochemistry of landscapes and the prospecting for minerals.

Two special volumes are being prepared for the press: Voprosy landshaftovedeniya (Problems in Landscape Science), for the Fifth National Conference on Landscape Science, and Perspektivy narodnogo khozyaystva SSSR (Prospects of the National Economy of the USSR), on the occasion of the 80th birthday of N. N. Baranskiy.

Besides the publication of Voprosy geografii the Moscow Branch has begun to publish more narrowly specialized symposia outside of that series.

The symposia Goroda-sputniki (Satellite Cities) and Les i vody (The Forest and Water), on forest hydrology, are in press; a symposium on the geography of inter-regional transport links is being prepared for the press.

The Branch's Phenological Commission, which has already accumulated a large body of observation data sent in by its correspondents, is also planning publication. The results of the systematization and analysis of the bulletins obtained data will be published in special bulletins and nature calendars. The Commission on the Geography of Moscow and the Moscow Region is planning a geographical dictionary of Moscow Oblast.

The Branch urges sections, departments and commissions to expand the publication of proceedings of discussions and the results of observations and research, using for that purpose the facilities of central and local publishing houses, mimeograph facilities, journals, bulletins and newspapers. The forms of printed dissemination of geographical knowledge can be quite diversified, including not only scientific publications, but popular scientific, publicistic and scientific-fiction publications, regional collections, landscape picture albums, dictionaries, atlases, guidebooks, posters, picture postcards and so forth. Members of the Society can contribute to this program not only as authors but as consultants, critics and public inspectors.

The exhibitional forms of dissemination include: geographical excursions to existing exhibitions and museums; participation in the discussion and improvement of exhibits; encouraging an increase in geographical exhibit topics; maintaining a modern scientific level in exhibits and improving the representation of specific local conditions; participation in the organization of topical exhibits showing geographical aspects of the fulfillment of the seven-year plan in the given oblast; exhibiting of the work of Society members and of the achievements of geographical, home-area and hiking and camping study groups of the given city or oblast, including the results of field trips and observations, landscape paintings, photographs and various collections.

Greater attention should also be given to the once popular form of excursion activities, including: participation in the organization of scientific and cultural-educational trips through the home town and home area ; assisting Society members in making study trips abroad and participating in critical discussion of the current state of hiking, camping and excursion activities in the home town and oblast (for example, reviewing the methods for planning hiking routes and sites to be visited, and public testing of excursion guides).

Radio-television forms of activities should not be underestimated, for example, participation in the organization of systematic radio and television broadcasts on geographical and home-area topics. Here, too, public discussion of content and form would be useful.

Under the heading of photographic and movies, the following activities are recommended:

(a) in cooperation with home-area museums, the inventorying and collection of photographs on the respective city and oblast with a view to establishing a systematic home-area photo collection as a source for the planning of exhibits, slide presentations and illustrations;

(b) photographic and amateur-movie contests on geographical and home-area topics;

(c) mass viewings of popular-scientific geographical films and organization of such showings for clubs (as is already being done in Moscow);

(d) preparation of scripts and outlines for geographical and home-area slide presentations and films.

Under the heading of library activities, assistance should be provided to local libraries in stocking geographical literature, in improving their organization and cataloguing, in preparing regional information bulletins, and in organizing topical and anniversary exhibits. Society units should expand their bibliographic and abstracting work, set up newspaper clipping files on their home areas, keep a bibliography of the writings of Society members. Organizations should also accumulate annotated bibliographies obtained from the authors themselves.

An important part of the activities of the Moscow Branch will be the convening in 1961 of several large meetings envisaged by the resolutions of the Third Congress of the Geographical Society USSR. Representatives of the home-area study community are expected to meet in the spring, and the Fifth National Landscape Science Conference (organized jointly with the Geography Faculty of Moscow University and the Institute of Geography of the Academy of Sciences USSR) is to be convened at the end of the summer. Preparations are under way to convene in 1961 a national conference on regional atlases. Planned for the beginning of 1962 is a national conference on the geography of population, and later in 1962 a conference on geography teaching methods. The Department of Economic Geography of the Moscow Branch will take part in the newly created Bureau for Coordinating Research in the Field of Economic Regionalization.

The Branch and its sections are planning anniversary meetings to mark important memorial dates, including the 250th anniversary of the birth of M. V. Lomonosov and the 150th of the death of P. S. Pallas in 1961, the 100th of the birth of V. V. Sapozhnikov in 1961, of A. N. Krasnov and N. M. Knipovich in 1962, and of P. K. Kozlov, V. I. Vernadskiy and V. A. Obruchev in 1963. The tenth anniversary of the death of L. S. Berg, president of the Geographical Society, will be marked at the end of 1960. Since 1960 the Moscow Branch is offering a series of special Obruchev lectures.

The Moscow Branch, which is the largest of the organizations of the Geographical Society USSR, is taking an active part in public life. Its representatives, together with members of the All-Russian Society for the

Conservation of Nature, sit in the commission of the Council of Ministers RSFSR that is drafting the Law on the Conservation of Nature; together with representatives of the Gosplan USSR the Moscow Branch is also taking part in the preparations for the national conference on the renewal of natural resources. Upon the request of the Department on School Geography, the Presidium of the Moscow Branch is intervening in the Ministry of Education RSFSR, the Academy of Pedagogical Sciences and its institutes in favor of greater emphasis on geography as a polytechnical subject and a way of raising the general cultural level of the country.

Ahead of us are years of fertile and diversified scientific and public activity that should bring about a further increase in mass participation and in the authority of the Moscow organization of the Geographical Society and its sections.

RECENT TENDENCIES IN THE DEVELOPMENT OF GEOGRAPHY AT MOSCOW UNIVERSITY

By A. M. Ryabchikov

(From Vestnik Moskovskogo Universiteta, seriya geografiya, 1960, No. 6, Pages 61-63)

(Abstract: Dean Ryabchikov of the Geography Faculty discusses the increasing use of physical, mathematical and chemical analytical methods by geographers, and their efforts to bring geographical research and teaching closer to the practical requirements of the Soviet economy. The article lists the principal field studies in which Moscow University geographers have been engaged in recent years.)

In recent years two tendencies have been especially characteristic and promising in the development of geography at Moscow University. The first involves the use, in addition to the former descriptive and interpretative methods, of new analytical computation methods for research on the development of the natural environment and on the distribution of productive forces. The new methods in geographic research are naturally based on advances in the physical-mathematical and chemical sciences. They include spectral observations of natural ultra-violet radiation, carried out by the meteorological observatory of Moscow University; radiolocation methods for probing the atmosphere, and radioactive methods for measuring soil moisture. In high mountain areas, glaciers are being surveyed with phototheodolites, ice-temperature soundings are made by means of semi-conductor thermometers, and seismic surveys are made with a portable 12-channel seismic station. Methods of qualitative and spectral analysis are widely used in studying the migration of chemical elements in natural landscapes. Economic geographers feel a need for wider application of linear programming, especially in the analysis of freight flows and other economic calculations needed, for

example, in economic regionalization. Paleographers and geomorphologists have long been using palynological and diatom analysis in stratigraphic and paleogeographic research. Recently they have felt a need for improved methods using radio-isotopes (radiocarbon and others) to determine the absolute age of rocks and buried soils. However the lack of an absolute-geochronology laboratory at the university has thus far limited the use of this method.

Substantial advances in the use of the new methods in geographic research have been stimulated and supported by the installation of 12 large laboratories in the Geography Faculty in the new building of the university. They are laboratories for study of the history of development of the natural environment and for the study of snow and ice with refrigerating equipment (able to produce temperatures of -70°C), a Class 1 meteorological observatory, a soils laboratory, laboratories for landscape studies and the geochemistry of landscapes (migration of chemical elements along the vertical: weathered zone of the earth's crust -- soil -- plants, and along the earth's surface from dispersion centers), laboratories of geomorphology, hydrology and geochemistry (which are being equipped with hydraulic installations making possible the modeling of runoff processes and river-channel and shoreline formation), laboratories of aerial methods (including photogrammetry and stereophotogrammetry), integrated and special-purpose mapping, and a problems laboratory for natural and economic regionalization. The Scholarly Council of the faculty and the national conference on the study, quality assessment and utilization of agricultural lands, which met in March 1960, have stressed the need for setting up one more integrated laboratory in the Geography Faculty for the study and quality assessment of agricultural lands and staffing it with physical geographers, soil scientists and economic geographers studying the distribution of agricultural production.

In addition to the previous scientific disciplines (which dealt mainly with components of the natural environment), new scientific trends, mainly of an integrated character, have been and are being established at the university on the basis of these laboratories. They are: paleogeography, study of the Arctic soils complex, landscape science and the geochemistry of landscapes, quality assessment of agricultural lands, natural and economic regionalization, applied geography, and population geography. It is hardly necessary to point out that the use of the new research methods enriches geography with more objective conclusions, speeds its development and raises the value and topicality of its results for practical purposes.

The second tendency involves bringing geographic research topics closer to practical needs. This is shown, in part, by an increase in the Geography Faculty's budgetary allocations for field work carried out under contract with designing and prospecting institutions, oblast executive committees (oblast government bodies) and regional economic councils from 500,000 rubles in 1952 to 5,200,000 rubles in 1960. Aside from the initiative of geographers themselves, the above-mentioned laboratories played an important role in increasing the volume of contract work.

The faculty's field-work activities effectively combine student instruction with practical work in the respective specialties. This year almost half of the more than 600 participants in 22 field trips of the faculty were upper-class students who worked in the field parties as collectors, observers, analysts, laboratory assistants and technicians. The more gifted upper-class students who had previously shown their ability in field work and the graduate students participated as geographer-engineers. The new teaching programs of the faculty, which have been worked out with a view to bringing the training of geographers closer to practical needs, provide for about half the study time in field and laboratory work (one-fourth of the study time in field and laboratory exercises and one-fourth in independent work in field parties, observatories, on ships at sea and in map factories, depending on the specialization).

The closer relationship between research and teaching, on the one hand, and practical requirements, on the other, and between the geography faculty and related research and production organizations has made it easier to find positions for young geography graduates. As a rule the number of job offers exceeds by more than 50 per cent the number of graduates. In the last four years about 30 per cent of the graduates have found jobs in scientific institutions and higher educational establishments, more than 50 per cent in designing, prospecting and production organizations, 5 to 7 per cent in middle schools, and 10 to 12 per cent have been given the right to work independently (for family reasons). The geographical distribution of graduate placements follows: 40 per cent in Moscow and Moscow Oblast, 60 per cent outside of Moscow, of which 20 per cent in the Urals.

The scientific research work of the faculty revolves around four problems:

1. The development of the natural geographical environment and its evaluation for economic utilization.
2. Natural and economic regionalization and the distribution of productive forces.
3. The water and heat regime of the earth's surface and the atmosphere.
4. Methods of compiling integrated geographical atlases and special-purpose maps.

In the last decade the faculty has carried out several large interdisciplinary field studies in physical and economic geography, mainly in the eastern areas of the country. The Eastern Siberian field group (1949-59) and the Kustanay field group (1955-60) are now working jointly with local organizations and with the Main Administration of Geodesy and Cartography on integrated physical-economic atlases of Irkutsk and Kustanay oblasts. The Transbaykalian field group (1958-60) is doing geomorphic, hydrologic and permafrost studies relating to the industrial development of Chita Oblast. The East Kazakhstan field group of economic geographers is spending its third year on a study of the distribution of productive forces of East Kazakhstan Oblast. Several field groups have been studying agricultural production in the central and southern parts of European Russia: the Central Chernozem group (1947-51), the

Ryazan' group (1954-60), the Stanislav group (1957-60), the Caspian group (1948-54) and others. A physical-geographic regionalization of eleven oblasts of the Central Non-Chernozem Region was carried out in 1959 on the basis of field research in connection with long-range planning of agriculture. Several years' field research in Transcarpathia are now being completed with the compilation of an agricultural atlas of the Transcarpathian Oblast.

Some of the field groups have been engaged in special research under contract to planning and economic authorities and to designing and prospecting organizations. For example, the Southern Urals field group (1956-59) worked out methods for geochemical-landscape prospecting for chalcopyrite deposits; the Chita group (1958-59) studied reserves of local building materials and their conditions of deposition; the Angara unit of the East Siberian group studied in 1957-59 the geomorphology of the construction sites of the Bratsk and Ust'-Ilim hydroelectric stations; the Eastern and Volga field groups (1957-59) studied the mineral building-material resources and the building industry in several areas of concentrated industrial construction, and so forth. The aerial-methods laboratory has developed a set of instruments for interpreting aerial photographs (stereoscopes and others) that were awarded small silver medals in 1959 at the Exhibition of Achievements of the National Economy USSR.

In 1956-59 the faculty took part in the activities of the International Geophysical Year (the El'brus, Pamirs and Khibiny field groups, as well as the Antarctic expedition). Partial findings of these groups have been published in five special volumes.

As a result of its research activities the faculty has worked out and introduced into practice some new methods of integrated mapping and compilation of special-purpose maps; prospecting for minerals by geomorphic and geochemical landscape methods, and quality assessment of agricultural lands (which formed the basis of the instructions for the geographical soils studies and soils mapping carried out by the Ukrainian Soils Service). The faculty has also proposed a scheme of economic-geographic regionalization for the USSR and carried out physical-geographic regionalizations of several oblasts.

The findings on natural resources and building conditions in Irkutsk, Chita, Kuybyshev, Ul'yanovsk and Astrakhan' oblasts and in Khanty-Mansi National Okrug have been handed over to the regional economic councils of the respective areas and to designing organizations (agencies for the planning of hydroelectric stations, water-management projects and urban planning). Geographers of the university have been consulted by the Economic Committee and the Legislative-Proposals Committee of the Supreme Soviets USSR and RSFSR. As a result of field research, university geographers have obtained valuable data on the problem of the development of the natural environment and the inter-relations of its components, and have made recommendations to appropriate organizations regarding improvement of navigation on the Northern Dvina River, anti-silting measures in reservoirs of the Kirgiz SSR, the

selection of the alignment of a cableway on Mount Ellbrus, avalanche-prevention measures, the use of Lake Shira in Khakassia as a health resort, the water supplies of certain construction sites, and so forth.

The product of the research of the university geographers is finding a growing outlet through the Moscow University Press, the Geographical Publishing House, the Hydrometeorological Publishers and others. Since 1960 the faculty is publishing the Geography Series of the Vestnik Moskovskogo Universiteta, which we are inclined to regard as a national geographical journal at the university level. In addition, the faculty's editorial and publishing laboratory and the map-publishing laboratory (equipped with a mimeograph machine) make it possible, in addition to printed publications, to publish about 25 to 30 mimeographed volumes (teaching aids, field-trip reports and so forth). In 1958 the faculty began the publication of the serial Geografiya i khozyaystvo, which prints articles of geographers and non-geographers with a view to bringing scientific research closer to practical needs and to disseminating geographical knowledge and methods among non-geographers concerned with the use of natural resources and the planning of the distribution of productive forces.

We are convinced that further efforts along the lines of the two tendencies discussed in this article, whether at Moscow University or at other geographical institutions, will increasingly promote the role of geography in the material and cultural progress of society.

(Editor's Note, S. G.: The following three articles are part of a program of review of published national atlases and recommendations for planning the content of future atlases. A fourth article, on agricultural maps, appeared in Soviet Geography, November 1960, pp. 56-61)

GEOLOGICAL MAPS IN NATIONAL ATLASES

By N. V. Krasil'nikova

(From Vestnik Moskovskogo Universiteta, seriya geografiya, 1960, No. 3, Pages 30-36)

(Abstract: The author reviews the group of geological maps in national atlases, comparing the form and content of geological-stratigraphic, tectonic, mineral-deposits, lithological-petrographic and Quaternary-deposits maps and making recommendations for greater uniformity of such maps in national atlases.)

One of the principal scientific and practical tasks of present-day geography is the creation of national atlases. The 18th International Geographical Congress in 1956 devoted much attention to that question and adopted a resolution creating a Commission on National Atlases,

whose aims and tasks were to assist countries in the creation of national atlases and in increasing their quality and uniformity.

A comparison of published atlases shows the depth of their differences, brought about not only by a variety of natural and social-economic conditions, but also by a subjective approach to the compilation of atlas maps, the planning of the list of maps, the drafting of the base maps, the choice of map information and the selection of representational symbols. At the 1956 conference of the Commission on National Atlases in Moscow, Soviet geographers expressed the desire to prepare for the 1960 Geographical Congress a list of recommendations designed to improve and unify national atlases. As part of that program, the present article examines the subject matter and content of the geological maps of national atlases.

The various aspects of the structure and development of the earth's crust are shown in atlases on several interrelated maps. The group of geological maps is included in the atlases for the purpose of presenting the geological structure of the country and studying its mineral resources and the relationships between the geological structure, on the one hand, and elements of the natural environment and the economic activity of man, on the other. This range of questions determines the usefulness of including in the atlas a geological and a tectonic map as well as maps of mineral deposits. Lithological-petrographic, hydrogeological and quarternary-deposits maps are also desirable. The last one is useful for establishing links between the geological structure and the relief.

The degree of detail in the content of the maps of the geological group depends on the purpose of the atlas, the map scale and the characteristics of the geological structure of the given country; the amount of geological exploration done in the country also has a bearing on this.

To insure map comparability and the possibility of integrated study of an area, there should be agreement among maps of the geological group and between them and other physical maps as to the mathematical and geographical character of the base map, mutual supplementation of content, the degree of detail in the classification of map elements and in the degree of generalization.

Published national atlases vary in the number and headings of geological maps, in the principles underlying the compilation of the base map, in the methods used to represent the contents, and in the quality of representation as regards completeness and detail.

Table 1 (Page 35) shows the headings of maps in the geological group of several atlases and their scales (the denominator in millions).

Many atlases also contain maps of individual regions and maps showing structural features specific for a given country (for example, a map of volcanism in the Italian atlas).

Table 1

	Geological	Tectonic	Lithology Petrography	Quaternary Deposits	Mineral Deposits	Structure	Ground Waters
Belgium (1)	1:0.5	1:1	1:0.5	-	1:0.5	1:0.5	-
Italy (2)	1:2.5	1:8	1:2.5	-	1:8	-	-
Lower Saxony(3)	1:0.8	1:0.8	-	-	-	-	1:0.6
Poland (4)	1:2.5	-	1:2	1:2	-	-	-
Middle Germany(5)	1:1.5	-	-	1:1.5	-	-	-
Finland (6)	1:2	-	-	1:2	-	-	-
France (7)	1:2.5	1:2.5	*	-	-	-	-
Czechoslovakia (8)	1:2.5	1:2.5	-	-	1:2.5	-	1:2.5
Sweden (9)	1:2	-	1:2	-	1:2	-	-
Britain (10)	1:1.7	-	-	-	1:0.6	-	-
Carinthia (11)	?	1:1	1:0.5	-	-	-	-
India (12)	1:5	-	-	-	-	-	1:0.5
Egypt (13)	1:2	-	-	-	-	-	-
BSAM (14)	1:15	-	-	1:10	1:7.5	-	-
BSSR (15)	1:2.5	1:2.5	-	1:2.5	1:4	-	1:4

(*) The lithology is shown on the geological map

The table shows that the list of maps in atlases is generally limited to one or two or three headings. Map scales vary with the size of the country, ranging generally from 1:1,000,000 to 1:2,500,000. Maps of smaller countries are compiled at scales larger than 1:1,000,000, and atlases of large countries, such as the USSR, contain general maps at scales of 1:10,000,000 to 1:15,000,000. Within the group, map scales are usually identical or commensurable. They are also commensurable with the scales of other physical maps in the atlases.

The principal maps in the geological group are the geological maps proper, or geological stratigraphic maps. The legends of these maps are now based on a single stratigraphic and geochronological scale. The structure of the earth's crust is shown with a varying degree of detail and accuracy, which makes it possible to use these maps for solving some problems of a theoretical and applied character. On the basis of the aims that can be achieved with a map at any given scale, the geological maps should show the structure of an area in accordance with modern concepts and should carry a load corresponding in content and in the degree of detail and accuracy to the scale of representation.

The content of the maps is reflected in their legends. In all published atlases the legends are based on the stratigraphic principle for sedimentary rocks and predominantly on the petrographic principle for igneous and metamorphic rocks. Some atlases distinguish only acid and basic rocks among the latter.

The degree of stratigraphic detail depends on the characteristics of the structure and on the scale. In areas of complex structure the stratigraphic detail is less than in areas of simple structure, but in some cases there is a tendency to preserve the same degree of detail. Increases in scale bring about increases in the degree of detail. Table 2 shows how the degree of stratigraphic detail varies with the scale.

Table 2

Map Scale	Degree of Stratigraphic Breakdown
1:500,000 - 1:800,000	Series of systems, sometimes stages
1:1,000,000	Series of systems
1:2,000,000 - 1:4,000,000	Systems, sometimes series of systems
1:4,000,000 - 1:5,000,000	Systems, sometimes combined systems
1:10,000,000-1:15,000,000	Systems, sometimes combined into groups

A greater degree of knowledge about the geology of a country makes it possible to increase the degree of breakdown of its stratigraphy. This is evident not only from a comparison of maps of countries that vary in the amount of available geological data, but even within a country whose parts have not been equally explored.

A single international stratigraphic scale is not maintained in the legends of a few atlases, which also include petrographic subdivisions. Since this scale has not yet been completely unified, the legends of some maps are not entirely comparable. Nor is there uniformity in the breakdown of lower taxonomic units.

The distribution of conventional symbols in the legends proceeds from the most recent to the oldest rocks and from sedimentary to igneous and metamorphic. The reverse order is also found, and sometimes even a mixed order, as in the Italian and Indian atlases.

The logical construction of the legends is sometimes disturbed by the inclusion in the stratigraphic section of, say, mineral deposits or faulted structures, regardless of age.

The colors chosen to designate the age and composition of rock formations vary in various countries and do not correspond to the international standard (atlases of Sweden, Britain, Italy, Czechoslovakia). Departure from the standard may be necessary for large map scales, for a detailed stratigraphic breakdown or if not all ages are represented within a given area. Otherwise it interferes with legibility and comparability of the maps.

The international indexing of rock formations by age and composition is entirely missing on some maps (Italy, Sweden) or is replaced by a non-standard indexing. The lack of indexes, especially in the case of non-standard coloring, makes it difficult to read the maps.

In addition to the age, the atlases of some countries give the petrographic composition(France) and mineral deposits (Sweden).

The principal method of representing rock formations on geological maps is a color background. Two background systems of representation are used if the map also shows the composition of rocks. They can be supplemented with conventional symbols.

Since the configuration of rock-outcrop lines on the earth's surface determines to a large degree the relief and drainage pattern of an area, proper representation of the mutual relationships between these elements on maps (on a small scale, in generalized form) greatly helps the reading and understanding of the geological structure, as can be seen on the maps of some of the atlases (France, Britain, Czechoslovakia).

The degree of detail on the maps varies. In some cases the outlines and some tiny windings of boundaries are of the order of fractions of millimeters; in other cases there is less detail, and sometimes the representation is virtually schematic.

Geological maps can be expected to meet several requirements in form and in content. The map content should be explained in a consolidated

legend, constructed on the basis of the principles of a scientific classification for each of the elements of the map content. The degree of petrographic and age breakdown of rocks can be selected and established on the basis of a classification of tectonic forms. In this connection it is useful to apply breakdowns of varying detail on the same map to areas that differ in structure. Atlas maps should carry the maximum possible amount of detail and the largest possible amount of selected information about the geological structure of an area and its history of formation.

The degree of detail of the maps, their accuracy for a given scale and the verisimilitude of representation can be insured through the use of certain methods of cartographic generalization (including the establishment of differentiated selection criteria) that have several specific characteristics in the compilation of geological maps.

The cartographic methods of representation and the adopted system of conventional symbols should insure objectivity and uniformity in the treatment of geological phenomena. The map legend should be constructed logically and concisely; it should be graphic and easy to read. The logical character of the legend can be brought out by graphic means. In addition to the color-background method, the map compilers can use several other methods of representation (isorithms, conventional symbols, area shadings) to show various qualitative details of the geological structure. In the case of igneous rocks, for example, both age and composition should be shown. Fault lines are also an essential map element.

Tectonic maps have not been very common thus far in national atlases. They are lacking in most atlases, and if they exist they differ from one another in the principles underlying their compilation and in methods of cartographic representation. This is due to the relative newness of tectonic maps and the inadequacy of the available data on the tectonics of the earth's crust.

In the French atlas elements of the tectonic structure are shown by conventional symbols -- linear and areal -- against a background representing the age of rock formations in more generalized fashion than the geological map.

The maps of some other atlases use color background to distinguish areas differing in the age of formation. The tectonic structures are shown against that background.

In the compilation of the tectonic maps of the USSR (the map at 1:5,000,000 and the map in the Belorussian atlas) the legend of tectonic units was based on the age of folding because regionalization based on the entire history of development of the earth's crust is still impossible in view of the uneven and inadequate available data on the geological structure of the earth. The International Tectonic Commission is now working out a tectonic map legend (based on the experience of compiling the tectonic map

of Europe at 1:2,500,000 and the map of the world at 1:15,000,000). The fundamental problems relating to the compilation of tectonic maps will apparently be solved in the near future, paving the way for the compilation of such maps in national atlases.

Geological and tectonic maps should be accompanied by cross sections showing those aspects of the structure and development of the earth's crust that cannot be represented on maps. Cross sections are especially important for folded regions in which igneous rocks are widespread.

Maps of mineral deposits show the distribution of minerals and their qualitative and quantitative characteristics. A mineral-deposits map shows a country's resources of raw materials and constitutes an important prerequisite for the integrated characterization of a country and for the reading of economic-geographic maps. Such maps are often missing in the published national atlases. On the existing maps the mineral deposits are usually shown by conventional symbols of geometrical form (for individual deposits) or by shaded areas (for extensive deposits).

Mineral deposits are usually represented without relation to the geological structure of an area (except for the Belgian and Italian atlases). Moreover the maps generally show only the qualitative aspect of mineral deposits. Quantitative characteristics, making possible comparisons, are not shown on the maps, but because of graphic representation of the more important deposits the latter can sometimes be arranged by two, three or more relative-size groups. The lack of quantitative characteristics on the maps is due in part to the difficulty of establishing a common quantitative index for comparing the sizes of deposits of minerals of various types.

The map of mineral deposits is best compiled at the same scale as the geological map. This makes it easier to compare the two maps in studying the question of formation and distribution of mineral deposits and their association with various types of structures and rocks. It is desirable to combine the representation of mineral deposits with the showing of the principal metallogenic factors. This does not mean repeating the content of the geological map, but requires a special interpretation of the geological structure of the area.

It would be desirable for the representation of mineral deposits to have a single system of conventional symbols for all countries, which should not be difficult for this group of phenomena. The maps should indicate the size and importance of deposits, which could be done, for example, on the basis of reserve figures. Any information of an industrial character, however, would seem to belong to the economic maps.

Lithological-petrographic maps showing rock composition make it possible to study the conditions under which rocks were formed through geological times. The range of problems that can be solved by these maps depends on the scale of representation. Such maps are found in several national atlases

(see Table 1). Their legends are based generally on the lithological-stratigraphic principle and do not always follow it strictly. The mode of representation is a color background showing differences in rock composition. When color is used to represent age, the composition is shown by a system of shadings.

This type of information does not necessarily have to be shown on a separate map in national atlases and can be incorporated in the geological map. However, if a separate map is included it should be at the same scale as the geological map. It should also use color instead of shadings because the latter are hard to read and difficult to show in tiny outlines. The separate map should also be compiled with the same degree of generalization as the geological map.

Maps of Quaternary deposits show the distribution of various formations of Quaternary origin or age. Such maps are important for knowing the history of development of the earth's crust, life on earth and its climate over the last million years. The practical usefulness of such maps increases with their scale.

Maps of Quaternary deposits are almost entirely lacking in published national atlases, and the existing maps differ from one another in the principles of subdividing Quaternary deposits by age. The reason for this is the relatively short duration of the Quaternary period, making it difficult to establish the meaning of series and stages within the Quaternary system.

The maps of Quaternary deposits are usually maps of genetic types of deposits arranged by age, with color indicating origin and various tints the age of the deposits. This approach is required by the great variety of genetic types of such deposits, among which geologists distinguish at least 20 basic types and many more subordinate types, some of which are of considerable economic importance. The lithological types of Quaternary deposits are generally shown at scales larger than 1:500,000.

Besides origin and age, these maps use a system of conventional symbols in varying degrees of detail and completeness to show depositional relief forms of Quaternary deposits. Sometimes these maps even show isorithms of neotectonic movements.

In addition to compiling genetic maps of Quaternary deposits there is also a need for maps based on the stratigraphic principle. But this must await a solution of the problem of classifying Quaternary deposits by age and working out comparable regional scales, and ultimately an international scale. Only then will it be possible to compile maps with a uniform legend, whose comparability will facilitate the solution of several theoretical and practical problems in geology.

In addition to the basic types of maps showing the principal aspects of

geological structure, national atlases can also include some additional maps. These can be divided arbitrarily into three groups: (1) maps showing individual specific aspects of the geological structure of a country; (2) maps showing the structure of individual geological regions; (3) maps showing structural relationships between the territory of a given country and adjoining geological regions.

These additional maps may be compiled according to separate principles, depending on the specific nature of the phenomena to be mapped, but since they are part of a group of maps they should also meet the requirements of the group as a whole. In this article we will not suggest specific additional maps for various countries, but there are some that can be common to several countries.

For arid countries it would be desirable to include hydrogeological maps (ground waters) and special attention should be given to working out that type of map. Thus far such maps are missing in national atlases.

For geological regions of the platform type, structural maps should be added to the atlases. Such maps should be compiled at a relatively large scale. If the scale is too small, information on the deep-seated structure can be included on the geological map, combining the representation of surface structures and deep-seated structures by several methods. In drawing the structural maps it is desirable to use in any one area not more than two systems of isorithms of constant thickness and to establish a uniform isorithm interval within a system.

In addition to these maps, each atlas may, according to the wishes of the compilers and depending on the character of the structure of a given country, include additional maps, the nature and content of which go beyond the scope of the present article.

Literature

1. Atlas de Belgique, Brussels, 1949
2. Atlante Fisico-economico d'Italia, Milan, 1940
3. Atlas Niedersachsen, Bremen, 1950
4. Atlas Polski, Warsaw, 1953
5. Mitteldeutscher Heimatatlas, Magdeburg, 1935-38
6. Suomen Kartasto, Helsinki, 1925-28
7. Atlas de France, Paris, 1930-45
8. Atlas Republiky Ceskoslovenske, Prague, 1935
9. Atlas över Sverige, Stockholm, 1953
10. Great Britain, London, 1942
11. Kärntner Heimatatlas, Klagenfurt, 1951
12. National Atlas of India, Calcutta, 1957
13. Atlas of Egypt, Giza, 1928
14. Bol'shoy Sovetskiy Atlas Mira (Great Soviet World Atlas), Moscow, 1937
15. Atlas Belorusskoy SSR, Minsk, 1959

POPULATION MAPS IN NATIONAL ATLASES

By O. A. Yevteyev

(From Vestnik Moskovskogo Universiteta, seriya geografiya, 1960, No. 4, Pages 20-25)

(Abstract: The author finds that population maps in national atlases should, as a minimum, treat population from four aspects: population numbers and density, geography of settlements, social and economic characteristics, and ethnographic characteristics. He notes that published national atlases generally slight the social and economic aspects in favor of strictly demographic characteristics of population.)

In addition to its other sections (physical, economic, cultural) an integrated national atlas must also devote attention to the mapping of population as the principal productive force of society (Reference 21).

The presentation of the geographical distribution of that productive force and of its characteristics relating to the distribution and character of the natural environment and the resources of a country, on the one hand, and to its economy, culture and politics, on the other, is one of the principal objectives of a national atlas (22). This is true especially of atlases that set themselves the practical goal of helping to solve the specific economic and social problems that are now of vital interest to many countries on the road to Socialist or independent national development. We should underline the importance of population maps for atlases of the Soviet Union and the other countries of the Socialist camp that are building and developing their economy and society on a planned basis. The population of a country should be treated as: (1) the manpower resources of the economy; (2) a consumer of material goods; (3) a carrier of culture, and (4) a political organism.

The treatment of population is also an essential link between the atlas sections dealing with physical, economic and cultural phenomena. The degree and the character of the utilization of natural resources cannot be fully analyzed without a thorough treatment of the population as the principal productive force of society.

An analysis of existing national atlases shows that many of them devote considerable attention to population (5, 10, 11, 16, 6, 23, 9, 14, 1, 2, 18).

However, there are national atlases where we find only one or two population maps (20, 7, 17). Unfortunately even Soviet atlases published in recent years assign a very modest place to population matters. The atlas of the Belorussian SSR (3), for example, has only one map showing the distribution of population.

Population can be studied from various points of view (24). The first is demographic and includes population numbers, its natural increase (birth and death rates), migration, age and sex composition, and so forth. These aspects are important for a geographical treatment of population and the practical purposes of a nation's economy. Demographic data, furthermore, provide the basis for other aspects of population studies.

However, for all their importance, demographic data do not reflect directly the social characteristics of the population. (Generally speaking, the social composition of the population is also a subject for demography. We thought it necessary to discuss social-economic characteristics separately because of their importance in providing a full-fledged picture of the population of a country, and especially because existing national atlases slight the social-economic aspect of population in contrast to the demographic aspect, as we understand it.) Social-economic characteristics, as opposed to the purely demographic aspects, include the social (class) composition and the occupational breakdown of population, the character of participation in social labor (production) and in the distribution of goods, social living conditions and other problems determining the social and economic life of the given country.

A third aspect of population study is the ethnographic aspect. It includes the ethnic composition and the national culture of the population, linguistic features and the history of formation of the population. Related to it is the so-called anthropological aspect of population, including data on differences in height, physical build and appearance of people.

One of the main aspects of population study is settlement geography, which is closely linked with physical conditions of the environment, the economic utilization of the territory and the level of development of the national economy.

Having thus defined the principal aspects of the geography of population, we can now determine to what extent they are reflected in national atlases.

The approaches to the mapping of population in national atlases vary greatly and these differences are explained least of all by geographical differences among the countries.

In most foreign national atlases demographic data hold first place. In the atlas of Czechoslovakia (6), for example, demography, in the narrow sense, occupies more than a third of the population section (which includes maps on public health and education): in the physical-economic atlas of Italy (11) almost half the population maps are demographic. In several atlases the entire content of the population maps is devoted to demographic matters (20, 7).

Considerable space is given to ethnographic characteristics. In many German and Austrian atlases, for example, there may be dozens of ethnic

maps. These atlases also include openly geopolitical and racist maps. Some atlases (23) concentrated on anthropological data. In general the ethnographic and demographic aspects dominate over other aspects of population study in atlases of the capitalist countries. In addition some atlases (10, 16, 5, 13) include maps of the geography of settlements. (Such maps are especially well represented in the atlas of France (10), the physical-economic atlas of Italy (11), where settlements are treated from several viewpoints -- functional, density, microgeographic; in the atlas of Sweden (16), which shows types of agglomerations and rural areas, density and settlement groupings against a background of natural conditions and economic land use. In the Swedish atlas settlement maps are accompanied by comprehensive texts on the geography of settlements.) Small-scale settlement maps are often supplemented by large-scale maps or photographs of various types of population centers, land-use maps for areas around rural population centers, and so forth.

In some national atlases, especially those designed for practical use, a certain amount of attention is given to the social and economic aspects of population. There are maps showing occupational composition; maps showing living conditions (for example, the condition or availability of housing); maps of employment and unemployment; maps showing the areas of influence of political parties, and so forth. In atlases of capitalist countries, we cannot, of course, count on a full-fledged and objective treatment of the social and economic life of the population or on a thorough analysis of its contradictions, but many social and economic aspects that are important for the solution of practical economic problems do find expression there.

In Soviet cartography there has been an attempt to create an atlas with a broad and diversified treatment of the social and economic aspects of population. The atlas of Moscow Obast (1), designed for use in the economy, devotes 10 sheets out of a total of 18 sheets of population and culture maps to social and economic topics. (In particular it shows the distribution of factory workers by place of work, with a breakdown by producer and consumer goods and the degree of industrialization of rayons; the distribution of building workers; the number of industrial and office workers by rayons and occupations and the distribution of workers employed in all branches of the economy; the dominant occupations of the population as a whole and of the industrial population in particular, and women's labor by rayons and occupations and the number of women industrial and office workers.) The atlas uses a correct methodological approach in representing population from the point of view of production and social activities, the character of participation in social production and the distribution of the products of social labor.

Unfortunately Soviet cartography thereafter departed from the social-economic approach to population studies and there is not a single atlas now in which this approach has been satisfactorily adopted.

Obviously greater attention to the social-economic aspect does not mean neglecting the other aspects of population mapping. Demographic data make up the basis for all other aspects of population study. Ethnographic characteristics are important both for the economy (from the manpower point of view) and for an analysis of the national culture. Even anthropological data can be important, for example, in answering questions relating to the production and distribution of various consumer goods. The representation of settlement geography is especially important in a national atlas because it clearly reflects the relationships between population, on the one hand, and the physical environment and the economy, on the other, thus tying together the major divisions of the atlas.

Thus none of the aspects of population mapping in a national atlas can be omitted or excessively limited without damage to the scientific and practical value of the atlas as an integrated product. These considerations determine the absolute minimum of population maps that must be included. They are:

1. A map of population numbers (density). It can be supplemented with maps or graphs of natural increase and migration, age and sex composition and other demographic data.
2. A map of settlement types (one or several), if possible with large-scale inserts of typical population centers, maps of economic territorial organization and other elements of settlement geography.
3. Social-economic maps of population (social and occupational composition, women's labor, distribution of national income, employment, living conditions, and so forth).
4. An ethnographic map, supplemented, if possible, with several maps with an ethnic and anthropological content.

If considerable space is devoted in an atlas to population maps, the above-mentioned basic maps of each aspect should be the principal maps, to be supplemented by others. If, for some reason, the population section must be reduced to the absolute minimum, these maps determine the smallest amount of space for that section.

The content of population maps will necessarily vary in countries with different social-economic conditions since the content is determined by the specific living conditions of each country. This is true especially of maps reflecting social and economic aspects of population. In capitalist countries, for example, where there is no full employment and the existence of a reserve army of unemployed is a legitimate phenomenon characteristic of the social-economic system, maps of employment and unemployment are essential for a treatment of population that is objective and complete from a scientific and practical point of view. As we have already said, maps of these types are found in several foreign atlases. They include several employment indices, such as the number of unemployed and their percentage relative to the number of employed and to the total manpower of the country; changes in unemployment by seasons and over longer periods; unemployment among men and women, urban and rural dwellers, and so forth.

Atlases of capitalist countries should also show the ratio between employers and employes in the total working population of the country as a whole and by segments of the economy since that ratio describes the character of production relationships in a capitalist economy.

In dependent and colonial countries an objective treatment of population should include the differences in legal and economic status between the native population and the privileged caste of colonizers.

Obviously there is no ground for treating subjects of that kind in countries with a Socialist economic system. Instead attention should be concentrated on the distribution, utilization and planning of manpower resources. It would be important, for example, to show the ratio of industrial workers, engineers and technicians, and office workers, the growth of labor productivity, the percentage of women among workers of various categories by segments of the economy, the percentage of persons with higher and middle technical education, changes in these indicators over time, and so forth. Of special interest are maps showing changes in the structure of the population (demographic and social), in education and in living conditions under a Socialist system.

The final list of headings of population maps, their topics, and the relative weight given to any approach in the treatment of population must depend in each case on the geographical conditions of the given country, the amount of available population studies, the state of statistical work, and so forth. But preferential treatment of any aspect should not lead to exclusion of any of the above-mentioned aspects from the population section of the atlas. Only if all aspects are taken into account will the population-map compilers insure the completeness, integrated treatment and mutual links with the other sections of the atlas that are so essential for any integrated atlas worthy of the name. At the same time such a complete treatment will insure a certain uniformity among atlases of various countries, which is now a major objective of cartography.

We should also note the need for a historical approach to the mapping of population, which is generally recognized among geographers both in the Soviet Union and abroad. Such an approach has been successfully used in several recent atlases (5,10).

We should also say a few words on the use of texts in the population section of national atlases. Most of the published and planned atlases contain such texts in more or less detailed form. The texts explain the methods of map compilation, which is especially important in population mapping, where compilers use many methods of representation that are sometimes difficult to distinguish by sight. The texts also list the sources used in map compilation, which is an important feature for practical use of the maps. The texts also serve as a supplement to the maps by giving characteristics of the population of the given country. For example, the atlas of Sweden (16) contains a concise, clear and specific textual discussion of population

that is closely coordinated with the maps. The accompanying text can also include additional maps and graphs. Unfortunately Soviet atlases, especially those published in recent years, contain no supplementary textual material (for example, 3).

In conclusion a few words about the placing of population maps in the atlas. Usually most of the population maps follow after the physical maps and precede the economic maps. This is a legitimate approach since population is the basic productive force of society. In some atlases (2) the main population maps even precede the physical section. In any case the purely demographic maps and the main maps showing social and occupational aspects of population should precede the economic section of the atlas. Particular maps showing occupations by segments of the economy can be included within the economic section (2,10). Maps showing the supply of consumer goods and services are most logically placed at the end of the economic section since they represent the end-result of the entire economic development of the country.

Settlement maps can precede the culture section and follow the economic section, which in effect determines the principal functional characteristics of settlements.

Maps showing the ethnic characteristics of population relate to the culture section (education, national culture, national politics). On the other hand, treatment of the ethnic composition of population is so important that it should not be relegated in its entirety to the final section of the atlas. The map showing ethnic composition is best placed after the demographic and ahead of the social-economic maps of population, while the particular ethnographic maps can be placed in the culture section.

These are our general views regarding the composition and content of population maps in national atlases. They represent a preliminary discussion of the principles underlying the planning of the population section, based on past experience in Soviet and world cartography.

Literature

1. Atlas Moskovskoy Oblasti, Moscow, 1933
2. Atlas Leningradskoy Oblasti i Karel'skoy ASSR, Leningrad, 1934
3. Atlas Belorusskoy SSR, Minsk, 1958
4. Atlas of Australian Resources, Canberra-Sydney, 1952-55
5. Atlas de Belgique, Brussels, 1949
6. Atlas Republiky Ceskoslovenske, Prague, 1935
7. Atlas Estadistico de Costa Rica, San Jose, 1953
8. Atlas of Canada, Ottawa, 1956
9. Atlas of British Columbia, Vancouver, 1956
10. Atlas de France, Paris, 1st edition, 1930-45; 2d edition, 1956
11. Atlante Fisico-economico d'Italia, Milan, 1940
12. Atlas Geografico General de Mexico, Mexico, 1949

13. Atlas von Niederösterreich, Vienna, 1952-54
14. Atlas Niedersachsen, Bremen, 1950
15. Atlas de Portugal, Coimbra, 1941
16. Atlas över Sverige, Stockholm, 1953
17. Atlas of the Tanganyika Territory, 2d edition, 1948
18. Baranskiy, N. N. "British Columbia. An Atlas of Resources," Voprosy geografii, No. 44, 1958
19. Bol'shoy Sovetskiy Atlas Mira (Great Soviet World Atlas), Vol. 1, 1937
20. Pequeno Atlas Geografico de Panama
21. Salishchev, K. A. Osnovy kartovedeniya. Obshchaya chast' (Principles of Cartography. General Part), Moscow, 1959.
22. Saushkin, Yu. G. Vvedeniye v ekonomicheskuyu geografiyu (Introduction to Economic Geography), Moscow, 1958
23. Suomen kartasto, Helsinki, 1925-28
24. Cherdantsev, G. N. "Social maps of the USSR. Types of social maps of the USSR," Tr. Mosk. in-ta. inzhenerov geodezii, aerofotos"yemki i kartografii, 1957, Nos. 24 and 25.

CLIMATE MAPS IN NATIONAL ATLASES

By I. N. Guseva

(From Vestnik Moskovskogo Universiteta, seriya geografiya, 1960, No. 6, Pages 26-32)

(Abstract: A complete climate section of a national atlas should contain maps, tables and graphs presenting data on climate-forming factors, the temperature regime, moisture supply, climatic regions and typical weather situations. Published national atlases are analyzed and recommendations for the treatment of climate are made. Particular importance is attached to the integrated presentation of several climatic elements on a single map. The value of climatic maps for various segments of the economy (agriculture, construction, transportation) is emphasized.)

Climate maps represent one of the principal component parts of the physical section of a national atlas. For example, the atlas of Italy (Reference 4) devotes 11 out of 22 physical maps to climatic data, the atlas of Czechoslovakia (14) 4 out of 12, and the atlas of Sweden (12) 8 out of 40; in other words, climate maps take up 20 to 50 per cent of the physical section.

The considerable attention and the large space given to climate maps in national atlases are quite understandable if we bear in mind, on the one hand, the role and the importance of climate for understanding the development of other physical elements and, on the other, the influence of climate on agriculture, industry and transportation.

The purpose of the present article is to analyze the content of the climate sections of atlases and their potential usefulness in scientific and practical work and to formulate basic principles for compiling climate maps in national atlases.

The wide use of national atlases in scientific research and practical work sets two basic requirements for climate maps. They must, first, provide a correct picture of the climate of the country consistent with the present state of climatology as a science and, second, contain data required by the economy, especially for agricultural purposes.

Climate is treated in the maps in the form of mean and extreme values of climatic indices. These elements are subject to a great diversity and a wide range in the course of a year, a season, a month or even a day. Specialized climatic atlases usually contain more than 100 maps. The climatic atlas of the United States (16) contains more than 1,000 maps. The climatic atlas of the USSR, now in preparation at the Main Geophysical Observatory, will contain about 400 maps, according to its prospectus. (For further details on the Soviet climatic atlas, see Soviet Geography, June, 1960, pp. 23-24.)

In view of the fact that an integrated national atlas is expected to give a complete picture of a country's physical and economic geography, the climate section must be limited to 30 or 40 maps. Only in some atlases are there as many as 70 maps (for example, the atlases of Sweden (12), Italy (4), and France (7)).

If the climate section is to be of independent scientific and practical value despite its limited space, the following requirements must be borne in mind in the planning and compilation of the maps:

1. The interrelationships between climate and other components of the natural landscape must be shown.
2. The climate maps must be comparable with other maps of the atlas.
3. Interrelationships between climatic elements must be shown.

These requirements can be met if:

(1) there is a judicious selection of climatic indices and characteristics and of the means of representing them in the atlas (in the form of maps, graphs, tables, etc.);
(2) two or three interrelated elements or their characteristics are presented jointly on the same map through judicious selection of cartographic methods for representing climatic indices;
(3) the geographical base map and the map scales are properly chosen.

A full-fledged climate section in a national atlas should contain maps, tables and graphs presenting data on climate-forming factors, the temperature regime, the moisture supply, a map of climatic regions, synthesizing the various indices and giving an integrated picture of the climate of a country, and maps and graphs of typical weather situations.

Among the maps of the first group, presenting data on climate-forming factors, it is desirable to have:

1. Maps of the length of the longest and shortest day and the number of hours of sunlight per year (as in the atlases of Finland (6) and Czechoslovakia (14)).
2. For large countries, such as the United States, the USSR and India , maps of the sum of radiation and the radiation balance (such maps are thus far lacking in foreign atlases), supplemented by graphs of the annual march of these elements at typical points. For smaller areas, this information can be limited to graphs.
3. Maps of atmospheric pressure and the principal paths of cyclones and anticyclones. Such a map is especially important for large areas. For small areas, such maps could include adjoining territories, as in the atlas of Poland (13).
4. Maps of the frequency of clear and cloudy skies in winter and summer or by seasons (as in the atlas of France(7)) and the number of clear and cloudy days during those periods (as in the atlases of Czechoslovakia (14) and

Lower Saxony (8)). These indices are important because the degree of cloudiness and the elevation and thickness of the cloud cover are factors in the radiation balance.

Maps of this group are of interest mainly in theoretical climatology, but some of them also have practical value, for example, the maps of the length of day for agriculture, the cloud-cover maps for aviation and aerial photography, and so forth.

The temperature regime can be presented in an atlas as follows:

1. Maps of mean temperatures for various periods. Depending on the amount of available space, there can be two such maps -- for the coldest and warmest months of the year (January and June in the atlas of Czechoslovakia (14), February and July in the atlas of Finland (6)); four maps -- for a typical month in each season (as in the atlas of Italy (4)); or 12 maps -- for each month of the year (as in the atlas of Australia (9)).
2. Maps of departure from normal temperatures, in the form of maps of mean maximum and minimum temperatures, temperature anomalies, maps of mean monthly temperatures of unusually cold or warm years, tables of possible limits of departure from normal temperatures, probability of given temperatures, and so forth.

Mean temperatures and departures from normal are of great theoretical value because they form the basis for deriving major climatological laws. They are also important for the economy because they give a general picture of the climate of an area.

3. Maps of mean dates on which the temperature passes through -10, -5 or 0° C during periods of temperature drop or rise; and through +5, +10 or $+15^{\circ}$ C, which characterize the conditions of plant growth; the length of the periods with such temperatures and the sums of positive temperatures during these periods.

Maps of the dates of the first and last frost and the duration of the frostless period in days (atlas of Belgium,(5))are important for agriculture, construction and other segments of the economy.

4. In order to bring out regional differences in the annual march of temperatures, the atlas should include graphs of the annual march for points in various parts of the atlas area, showing the dates of maximum and minimum temperatures and the rate of temperature rise or fall from month to month. Such graphs are included in the atlas of Sweden (12) for 18 points situated in various parts of the country.

Maps of mean annual temperatures, widely used in national atlases, present little interest for describing the climate of such a relatively small territory as a country. Such a climatic indicator is useful only on very small-scale maps of climatological comparisons and should therefore be omitted. (See B. P. Alisov and others, Klimaticheskiy analiz nablyudeniy meteorologicheskoy seti MGU (A Climatic Analysis of the Observation Data of the Meteorological Network of Moscow University), Geography Faculty, 1958, manuscript.)

Data on the moisture supply of a territory should be presented in the form of maps, graphs, tables and text presenting the following: (1) precipitation data; (2) air humidity; (3) soil moisture. (See P. I. Koloskov, Agroklimaticheskoye rayonirovaniye Kazakhstana (An Agroclimatic Regionalization of Kazakhstan), Moscow University, 1947.)

Precipitation data should be presented for agriculture by months or by corresponding temperature periods since various crops require a certain amount of precipitation in various growing periods. In the atlas of Italy (4), for example, there are 17 precipitation maps: annual total, by months and by seasons. Since precipitation data cannot always be treated in such detail, an atlas should include at least a map of total annual precipitation and a map of precipitation in the warm growing season, which will vary in different atlases with local conditions, supplemented with graphs of the annual march of precipitation for individual points of the atlas area.

The moisture supply of an area depends not only on the total precipitation, but on the intensity of precipitation, the frequency of rainy days and the amount of evaporation. It is therefore useful to have maps showing the number of days with precipitation in general and the number of days with precipitation of certain amounts (for example, exceeding 1 mm. or 10 mm. a day, as in the atlas of Belgium (5)) as well as maps, graphs and tables showing evaporation.

Cold-season precipitation plays an important role because crops sometimes grow and mature largely on the basis of that moisture supply. An atlas should therefore include maps of the mean dates of formation and melting of the stable snow cover, its duration and its height.

From a practical point of view it would be interesting to show departure from normal precipitation both relative to precipitation and relative to temperatures. This can be done in the form of maps of precipitation anomalies, as in the atlas of Italy (4); maps of precipitation of the wettest and driest months over a long period, as in the atlas of Sweden (12), or dot graphs, as in the British atlas (17). The last named are of great interest because they picture not only the annual march of precipitation, but also the probability of any given amount of precipitation and its extreme limits.

An important climatic element affecting the direction and intensity of many chemical, biological and physical processes is air humidity. However, maps or even graphs showing humidity are still quite rare in atlases. The atlas of Finland (7) contains maps of relative humidity in winter and summer (as of 7 a.m. and 1 p.m.) and graphs of the annual march of humidity; the Great Soviet World Atlas (2) contains maps of relative humidity as of May for the whole USSR and as of April and October for the eastern part of the USSR. Humidity data are important especially for judging evaporation. From that point of view a national atlas should contain a map of relative humidity of the warmest month as of 1 p.m., when it is at its lowest, and graphs of the annual march of humidity for various points.

Some atlases contain aridity index maps, based in the atlases of France (7) and Sweden (12) on de Martonne, and in German atlases (18,19) on Reichel. These maps are derived from several climatic indices and the question of inclusion in an atlas must be settled for each country separately.

The moisture supply of any given area is characterized only by soil moisture, which can be measured directly. Soil-moisture data are still inadequate for the compilation of maps, but graphs of individual points for which data are available would be of great value.

An essential part of climatic description is data on winds. In some atlases (for example, Poland (13)), the prevailing winds are shown. However, for practical purposes the most important information is the frequency of various wind velocities and directions in the form of a wind rose (as in the atlases of France (7), Italy (12) and Belorussia (1)).

In the compilation of maps of various elements it is useful to use uniform periods -- months, seasons or periods marked by definite temperature dates -- to make possible comparisons between maps.

Some atlases contain maps of climatic regions. These are constructed on the basis of a variety of principles. The atlas of Finland (6), for example, uses the principles of Köppen and Hult. The atlas of Poland (13), instead of a map of climatic regions, uses a map of climatic isogradients, which distinguishes regions on the basis of a group of climatic indices. The gradients increase with the quantitative differences between these indices. The map is designed to serve as a tool for the automatic delimitation of regions. In these atlases, maps of climatic regions are compiled at the smallest scale for the given atlas.

In the atlas of Australia (9), the map of climatic regions is at 1:6,000,000, which is the scale adopted for all the general physical and economic maps. It includes "climatic types" (subequatorial, tropical and so on), and within them 16 "geographical types" based on elevation and distance from the sea. The "geographical types" are further subdivided into areas differing in geographical location. Each area is characterized by climatic graphs relating to a given station. The map uses various methods of cartographic presentation and is easy to read.

Still other types of maps of climatic regions could be cited. But in spite of the lack of generally accepted principles of climatic regionalization, it is very desirable to include a map of climatic regions in a national atlas. Such a map should represent a synthesis of climatological indices and give an integrated picture of the climate of a country. The map may be supplemented by graphs showing regional differences in the annual march of climatic elements and by climatic descriptions of regions. Such a map is very important for comparison with other physical maps. Therefore it should be at the same scale as the others.

For an evaluation of the accuracy of interpolation on climatic maps, the atlas should include one or more maps of meteorological stations whose data were used in the compilation of the climate maps. If the map of climatic regions has sufficiently open areas, it can show the stations with indication of the number of years of observations and the class of the station.

Climatic presentation in the atlas would not be complete without giving the weather situations that are most important from an economic point of view. This can be done by the combined presentation of several meteorological elements on the same map (as in the atlas of Egypt (11)), a group of maps (as in the atlas of France (7)) or by integrated climatic graphs. Typical weather situations should also be supplemented by synoptic weather charts (as in the atlas of Italy (4)).

The climate maps in a national atlas are closely related to all other sections, for example, hydrographic maps, agriculture maps and so forth. On the borderline between agriculture and climate maps there are often plant phenology maps showing the planting dates and the dates of various growth phases of individual plants (atlases of Lower Austria (15), France (7) and others). If data for such maps are available, they constitute a useful addition to the atlas.

The foregoing list of climatic indices is desirable for inclusion in national atlases, but in view of different conditions prevailing in each country (availability of climatic data, the size of the country and its geographical location) the same elements may be included in the atlas in various forms (maps, graphs, tables, texts and so forth), they may be excluded entirely, replaced or supplemented by other indices of interest to the particular country.

For example, if space is available, the atlas should include maps of the mean dates on which the temperature passes certain limits, as in the atlas of Sweden (12).

If space is limited, the most important temperature limits for the given country should be selected. For example, for countries situated in the temperate zone, the principal temperature index from the point of view of agriculture is the sum of temperatures above $+10^{\circ}$ C because it is needed by the majority of crops. For subtropical crops the sum of temperatures above 15° C is the determinant. This index would therefore be very useful in atlases of countries situated in the subtropical and tropical zones.

In compiling the climate section of a national atlas, an effort should be made to insure comparability among climate maps, with other physical maps of the atlas and with the climate maps of other atlases.

Comparability within the climate section can be insured by showing interrelated climatic elements (atmospheric pressure, cyclone and anticyclone paths, cloud cover and so forth) on maps of identical scales for given periods of time.

Great importance is attached to the joint representation of several interrelated climatic elements and characteristics. Examples of the integrated presentation of indices on a single map can be found in the Great Soviet World Atlas (2), the atlas of Poland (13) and the Morskoy Atlas (3). But the majority of climate maps usually present only a single element, which means that the map space and the possibilities at the given scale are not fully utilized. Integrated presentation of climatic indices on maps is a way of increasing the number of climatic indices in the atlas, i.e., to achieve a more detailed and thorough treatment of climate, and, what is most important, to present the interrelationships between climatic elements that are of interest for climatology as a science.

To insure comparability of the climatic maps with other physical maps, the atlas compilers must: (1) compile the climatic maps with due consideration for the effect of various geographical factors on climate; (2) bring the scales of the climate maps close to the scales of the other physical maps; (3) use base maps showing a corresponding amount of detail.

The climate section should be accompanied by a text containing a brief description of the climate and weather of the atlas area, as well as a listing of sources and a discussion of the compilation methods used.

Literature

1. Atlas Belorusskoy SSR, Moscow-Minsk, 1958
2. Bol'shoy Sovetskiy Atlas Mira (Great Soviet World Atlas), Vol.1, Moscow, 1937
3. Morskoy Atlas (Marine Atlas), Vol. 2, Moscow, 1953
4. Atlante Fisico-economico d'Italia, Milan, 1940
5. Atlas de Belgique, Brussels, 1949
6. Atlas de Finlande, Helsinki, 1925-28
7. Atlas de France, Paris, 1st edition, 1930-45; 2d edition, 1951
8. Atlas Niedersachsen, Hannover, 1950
9. Atlas of Australian Resources, Canberra-Sydney, 1952
10. Atlas of British Columbia, Vancouver, 1956
11. Atlas of Egypt, Giza, 1928
12. Atlas över Sverige, Stockholm, 1953
13. Atlas Polski, Warsaw, 1953
14. Atlas Republiky Ceskoslovenske, Prague, 1935
15. Atlas von Niederösterreich, Vienna, 1952
16. Climatic Atlas of the United States, by S. S. Visher, Indiana University
17. Great Britain, London, 1942
18. Klima-Atlas für das Gebiet der Deutschen Demokratischen Republik, Berlin, 1953
19. Klima-Atlas von Hessen, Bad Kissingen, 1950
20. National Atlas of India, Calcutta, 1957

A DETAILED GEOGRAPHICAL FIELD STUDY OF SOLONETS COMPLEXES IN THE DRY STEPPE ZONE

(based on findings of the Kustanay Field Group of Moscow University)

By S. V. Golovenko, N. A. Yegorova and N. P. Osadchaya

(From Vestnik Moskovskogo Universiteta, seriya geografiya, 1960, No.6, Pages 33 - 39)

(Abstract: The microgeographic field study described in this paper was designed to investigate the evolution of solonets soil-and-plant associations in the dry steppe of northern Kazakhstan. The detailed sequence of soil-and-plant associations is described and mapped, and the burrowing activity of rodents is described as a significant factor in the evolution of solonets complexes.)

The question of the origin, the trend and the moving forces of the natural evolution of solonets complexes in the virgin and idle lands of Siberia and Kazakhstan has not only theoretical but great practical importance. Its solution requires integrated detailed field study of the solonets areas by specialists in different geographic disciplines. The present article discusses the methods used in such research by soil scientists, geobotanists and zoogeographers. The article also includes selected fragments of field sketches of key sections and some conclusions regarding the origin and the moving forces of the natural evolution of the most common types of solonets complexes in the study area.

The field study was carried out in the summer of 1957 by members of the Kustanay field group of the Geography Faculty of Moscow University in contiguous parts of the Severnyy and Pskovskiy state farms of Irgiz Rayon, Aktyubinsk Oblast. The study included a detailed survey of key sections together with continuous large-scale mapping of the surrounding territory of about 250,000 ha. at the scale of 1:50,000. The mapped territory was sufficiently large to provide basic genetic types of solonets complexes and the general laws of solonets occurrence in the western part of the dry steppe zone of the Turgay tableland.

In the most typical sections of each type of solonets complex, as well as in the transition zones between types and in the surrounding non-solonets zonal complexes, the field group selected two detailed study plots each, 60 to 240 meters long (depending on the complexity of the plot) and 60 meters wide. The work began with a topographic traverse by means of a leveling instrument. Then the geobotanist joined in. For the purposes of a detailed geobotanic survey at 1:100, the plots were divided into 10-by-10-meter squares. The plant associations within each square were mapped according to a generally accepted system: general characteristics of the plant cover, its species composition, plant abundance on the Drud scale, the number of plant tiers, the phenological phase, and the percentage plant cover.

Then the zoologist joined the study. His job was to determine the character, the amount and the laws of distribution of the burrowing activity of rodents. He mapped burrows and mounds of rodents, suslik and bobac mounds in various stages of development, mole-rat hills and so forth. Relatively large mounds and burrows were mapped at scale. Other evidence of burrowing was indicated on the maps by symbols. In areas of widespread mounds and molehills, the density and limits of distribution were mapped. The diameter and height of the largest mounds and burrows were measured. In order to estimate the amount of earth excavated in mounds and burrows, all plant-association areas were divided into one-square-meter areas in which the average volume of excavated earth was estimated for each type of burrowing activity.

The final stage of the work was the soil survey. Some of the soil profiles were obtained in trenches designed to determine the characteristics of the transition between basic components of the solonets complexes. Trenches and other soil sections were extended by drilling to 1.7-6.5 meters depending on the depth of the highest aquifer. Samples of soil horizons and rocks, plant matter and samples of surface and ground waters were collected to determine the natural moisture of the soil and for mechanical, chemical and other analyses. The character and depth of burrowing were also examined in the walls of the soil sections.

The solonets complexes of the study territory can be divided into two groups: (1) solonets formed on mineralized ground water, and (2) steppe solonets unrelated to ground water. Within the first group we can distinguish meadow solonets and meadow-steppe solonets, depending on the nature of the relationship with ground water.

Meadow solonets represents the initial stage of formation of solonets on ground water and occurs on the lower terraces of the lakes that are so common in the study area. The terraces slope toward the lakes and consist of lacustrine and lacustrine-sheetflood clays and loams. The shoreline sections are flooded regularly in spring; the rest of the surface is flooded only in unusually wet years. The mineralized ground water is at a depth of 0.5 to 2.5 meters; the ground-water level drops with distance from the lake shore. Except for relatively rare suslik mounds and occasional depressions inherited from the former lake bottom, there is virtually no microrelief. The soil and plant cover is developed on a capillary network fed by ground water that is clearly marked by tiny surface irregularities, especially near the lake shore.

Fig. 1 (Page 58) shows part of a detailed plot on the lower terrace of Lake Chelbar. The lowest parts of the lake-shore zone were still flooded at the time of the survey (in late July); occasional specimens of sarsazan (Halocnemum strobilaceum), a halophytic subshrub, protruded above the water. The higher terrace sections were occupied by solonchak -solonets with solonchak wormwood-derbennik and derbennik-sarsazan plant associations, and in transition zones meadow solonchak soils dominated under rush-azhrek (Aeluropus littoralis) plant associations.

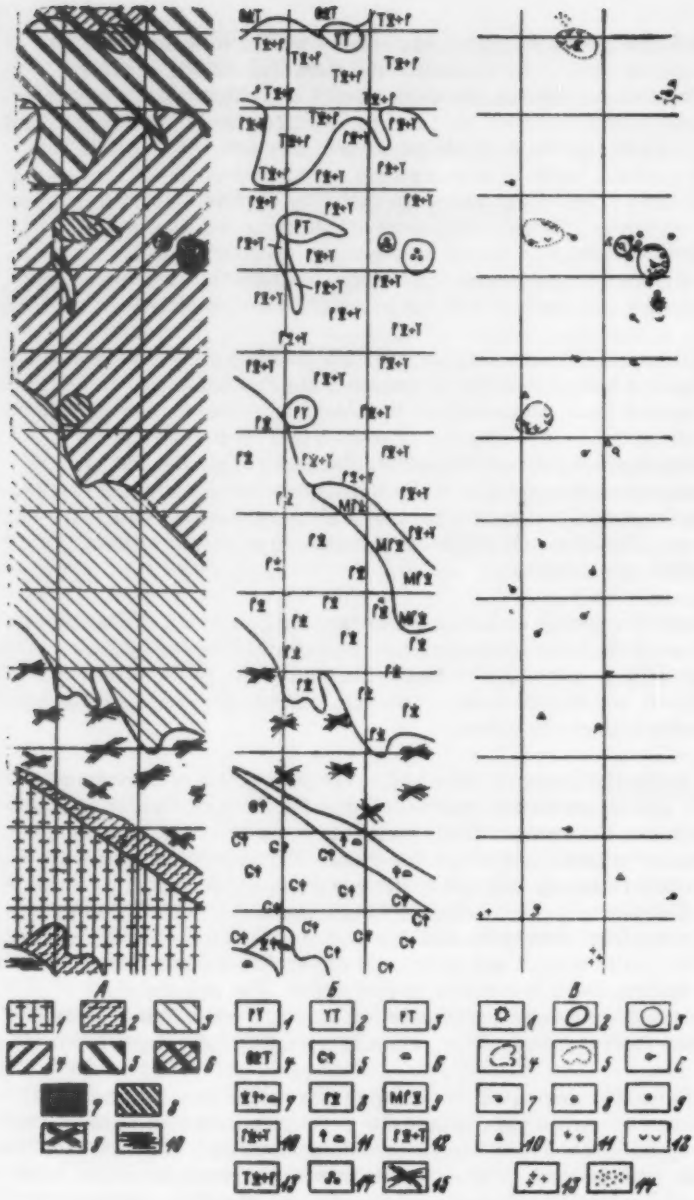

Fig. 1. Part of a field sketch of the meadow solonets complex on the lower terrace of Lake Chelbar, 3 km. west of Zhana-Daur village.

Legend (Fig. 1)

A. Soils:

1. solonchak-solonets
2. meadow solonchak
3. weakly solonized meadow solonets
4. moderately solonized meadow solonets
5. strongly solonized meadow solonets
6. strongly solonized meadow solonets transitional to meadow-steppe solonets
7. "buried" meadow solonets
8. "degraded" meadow solonets
9. wave-line zone with driftweed
10. lake surface

B. Vegetation:

1. wormwood-wheatgrass
2. wheatgrass-steppe fescue
3. polynok (Artemisia austriaca) -steppe fescue
4. grudnik-solonchak wormwood-steppe fescue
5. rush-azhrek (Aeluropus littoralis) littoralis)
6. sarsazan (Halocnemum strobilaceum
7. solonchak wormwood-derbennik with sarsazan
8. obiona-solonchak wormwood
9. bluegrass-obiona-solonchak wormwood
10. obiona-solonchak wormwood with wheatgrass
11. derbennik-sarsazan
12. obiona-solonchak wormwood with steppe fescue
13. steppe fescue-solonchak wormwood with obiona
14. single specimens of biyurgun (Anabasis salsa), saltbush, solonchak wormwood and greasewood
15. wave-line zone with driftweed

C. Burrowing activity of rodents:

1. material ejected by small suslik
2. fresh suslik mounds
3. perennial, repeatedly renewed suslik mounds
4. leveled suslik mounds
5. slumped suslik mounds
6. inclined holes of the small suslik, inhabited
7. inclined holes of the small suslik, abandoned
8. vertical holes of the small suslik, inhabited
9. vertical holes of the small suslik, abandoned
10. holes of the large jerboa
11. holes of the short-tailed steppe vole, inhabited
12. holes of the short-tailed steppe vole, abandoned
13. material ejected by the mole rat
14. diggings

Above the wave line of annual flooding, marked by a sinuous zone of driftweed, lies a weakly solonized solonets belt with obiona-solonchak wormwood vegetation, which is replaced in the higher reaches by moderately solonized solonets under the same type of vegetation, but admixed with wheatgrass (Agropyron ramosum). Still higher is a strongly solonized solonets belt under plant associations in which steppe fescue and solonchak wormwood predominate. In the highest part of the study plot, where the lower lake terrace passes into the higher terrace, the steppe fescue-solonchak wormwood associations are replaced by grudnik-solonchak wormwood-steppe fescue associations. These are developed on a mixed capillary and pellicular network of ground water, which lies at a depth of more than 2.5 meters. The strongly solonized solonets belt that is characteristic of this zone marks the transition to the following meadow-steppe stage of solonets development.

The sharp boundaries between belts and the similarity between their wavy trace and the sinuous wave line of the lake's spring level evidently show the relationship between the sequence of solonets belts and the successive stages of retreat of the lake waters.

One notes the small number of burrowing rodents, which include the small suslik, the short-tailed steppe vole, the large jerboa and the mole rat. Consequently the reclaiming effect of the rodents on the solonets soils and vegetation is quite insignificant and is limited to the more or less active role of the suslik.

The burrowing activity of the suslik depends on the type of solonets. Its character changes as the terrace rises above the lake. In the annually flooded shore-line belt there are only temporary inclined burrows. Above the wave line are well-formed perennial suslik mounds that may exceed 5 meters in diameter. They are usually inhabited and are 0.2 to 0.4 meters high; they contain a large number of both inclined and vertical burrows. From the soils viewpoint, these suslik mounds consist of the buried solonets typical of the lower terraces; this solonets has been heavily turned over by digging and is covered by a few plant specimens, chiefly saltbush, biyurgun (Anabasis salsa) and greasewood. The constant excavations of salinified soil speed the solonets-forming process and lead to the formation of a second weakly defined solonets horizon in the upper part of the excavated layer. In addition surface effervescences of hydrogen chloride are observed in many places in the excavated layer, indicating the presence of lime. In addition to the inhabited suslik mounds, which are constantly renewed, there are also mounds that have been abandoned by the susliks. The abandoned mounds are in various stages of collapse, depending on the time elapsed since abandonment. Among them are leveled mounds and slumped mounds, producing a noticeable settling of the ground compared with the surrounding surface. In contrast to the inhabited forms, abandoned mounds are covered with wormwood-wheatgrass and wormwood-fescue plant associations. The excavated layer contains already a noticeable amount of humus; no lime is in evidence, and the upper solonets horizon has been entirely destroyed. The morphology of the soil of such abandoned mounds is similar to that of meadow-chestnut

soils with a deep (buried) solonets horizon, and such a soil has been designated arbitrarily as degraded solonets.

Among the other burrowing rodents a more or less important role is played by the steppe vole, which lives in colonies among the slumped, rarely among the leveled, suslik mounds.

The changes in the soil cover that take place as the distance from the shore line increases and the increasing appearance of steppe species among the plant associations suggest a process of steppe advance associated with the formation of the lower lake terraces. However at its present stage that process is passing through a phase of general solonets formation of the plant and soil cover and is therefore progressing at a very slow rate. This is explained by the effect of "retrogressive" changes in the hydrologic regime in unusually wet years, when the lower lake terraces are flooded and the ground-water level rises.

The unstable hydrologic conditions of the lower terraces are one of the principal causes of the small rodent population. In view of the relatively limited burrowing activity the plant and soil cover there is still in its initial stages of solonization.

The meadow-steppe solonets is formed on the higher lake terraces. The soil-forming rock is made up of lacustrine-sheetflood heavy loams and clays of heavy mechanical composition. There are occasional inherited lake-bottom depressions and superimposed residual erosion troughs. In addition the microrelief consists chiefly of zoogenous forms, such as suslik mounds. The depth of the ground-water level ranges between 3.0 and 5.0 meters, increasing gradually as the surface rises.

The soil and plant cover as whole represents the next stage of the biogeomorphic cycle of evolution toward steppe formation and has a typically integrated character. The fragment of the study plot in Fig. 2 (Page 62) was mapped on the upper terrace of Lake Ayke and can serve as an example of a meadow-steppe solonets complex. Aside from the residual erosion trough with meadow-chestnut (including lime) soils the dominant features in this area are moderately solonized meadow-steppe solonets under steppe-fescue and solonchak-wormwood plant associations. All other members of the solonets complex are derived from these soil and plant associations and arose mainly as a result of burrowing by rodents.

These rodents are far more numerous here than in the meadow solonets complexes. The same sharp increase is evident in burrowing activity, which has a considerable reclaiming effect on the solonets soils and vegetation formed in the preceding stage of development. As the active moving force of evolution of the plant and soil cover, this burrowing activity tends to speed the current solonizing stage of the steppe-formation cycle.

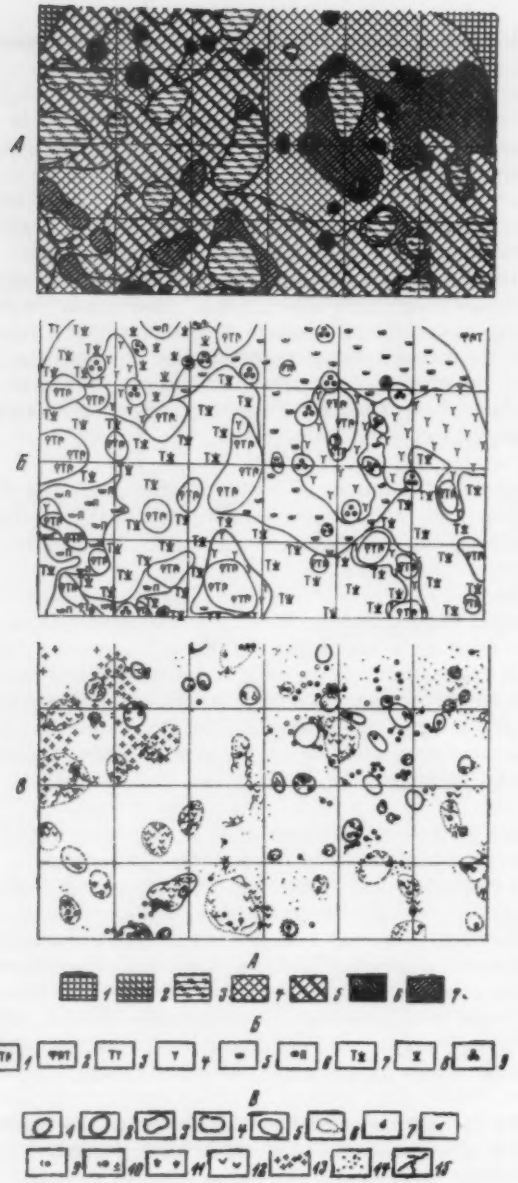

Fig. 2. Part of a field sketch of the meadow-steppe solonets complex on the upper terrace of Lake Ayke, 1.7 km. southwest of the central settlement of the Severnyy State Farm

Legend (Fig. 2)

A. Soils:

1. meadow chestnut
2. limy meadow chestnut
3. meadow-chestnut solonets
4. moderately and weakly solonized meadow-steppe solonets
5. moderately solonized meadow-steppe solonets
6. "buried" meadow-steppe solonets
7. "degraded" meadow-steppe solonets

B. Vegetation:

1. pyrethrum-steppe fescue-feathergrass
2. mixed herbaceous-feather-grass-steppe fescue
3. steppe fescue-wheatgrass
4. wheatgrass
5. black wormwood
6. black wormwood-prostrate summer cypress
7. steppe fescue-solonchak wormwood
8. solonchak wormwood
9. single specimens of saltbush, wheatgrass and solonchak wormwood

C. Burrowing activity of rodents:

1. material ejected by the small suslik
2. recent suslik mounds
3. perennial, repeatedly renewed suslik mounds
4. suslik mounds in process of destruction
5. leveled suslik mounds
6. slumped suslik mounds
7. inclined holes of the small suslik, inhabited
8. inclined holes of the small suslik, abandoned
9. vertical holes of the small suslik, inhabited
10. vertical holes of the small suslik, abandoned
11. holes of short-tailed steppe vole, inhabited
12. holes of short-tailed steppe vole, abandoned
13. material ejected by the mole rat
14. diggings
15. fissures in the soil surface

Solonets formations that differ from the dominant component mainly through a more clearly defined solonets horizon and a shallower depth of salt deposition are associated with black wormwood and prostrate summer cypress on the talus of inhabited suslik mounds. As far as can be gathered, they result from an intensified solonizing process related to the accumulation of soluble soils leached by sheet runoff from the soil excavated by the susliks. Directly on the inhabited suslik mounds, which are usually found among the dominant solonets components, are similar solonets formations associated with a sparse cover of saltwort, wheatgrass and solonchak wormwood, but in this case the excavated layer shows evidence of hydrogen chloride effervescence.

The upper part of the excavated layer contains a weakly defined solonets horizon. The stages of evolution of abandoned suslik mounds are represented first by destroyed mounds with "degraded" solonets, mainly under wheatgrass associations, and then by leveled and slumped mounds, on which pyrethrum-fescue-feathergrass associations occur usually on meadow-chestnut solonets soils. These soils differ from the "degraded" solonets by their greater humus content and the greater thickness of the upper (humus and transition) horizons.

The soil-loosening activity of rodents here is far greater than in the meadow solonets complexes. Many diggings are found in the immediate vicinity of suslik mounds and also cover large areas between mounds.

If we compare the three field sketches of vegetation, soils and traces of burrowing activity in this section (see Fig. 2), we note at once that the areas of "degraded" solonets and meadow-chestnut solonets soils are often larger than the areas occupied by abandoned suslik mounds. This is explained by the fact that the reclaiming role of the suslik in meadow-steppe solonets complexes is often associated with substantial burrowing by smaller rodents, such as the short-tailed steppe vole and the mole rat. The walls of soil cross sections and trenches exhibit uneven burrowing through the "degraded" solonets and meadow-chestnut solonets soils. There are intensively disturbed sections, corresponding evidently to abandoned suslik mounds, but there are even larger sections in which there are relatively few traces of suslik burrowing. This indicates in the given stage of the steppe-formation cycle that the small suslik, in addition to its direct reclaiming of solonets soils and vegetation, also acts as a kind of "instigator" of the process. Sections dug over by the suslik are then invaded by smaller rodents, which gradually extend their burrowing zone, as can be seen from Fig. 2. By breaking up the upper horizons of solonets patches in the immediate vicinity of suslik mounds, the smaller rodents promote the growth of wheatgrass, followed by steppe fescue, pyrethrum and other meliorative plants. The renewal of suslik burrowing that can be observed in some places on "degraded" solonets and on meadow-chestnut solonets soils results mainly in a thinning out of the plant cover and a greater digging over of the soils, without producing any more substantial changes in the soil profile.

At points where the surface of the upper lake terraces passes into the surrounding surface of the tableland, the meadow-steppe solonets complexes

lose their connection with the ground waters. The meadow-chestnut solonets soils are gradually transformed into chestnut solonets patches, which gradually increase in number and in area. On the slopes of the tableland these soil patches merge with one another and completely replace the meadow-chestnut solonets soils.

Steppe solonets complexes were investigated on residual hills rising above the tableland, and on the ridges of the broad Sypsyn trough, one of the branches of the ancient Turgay valley. In contrast to the solonets complexes linked with mineralized ground waters, the steppe complexes are closely related to tiny surface irregularities, such as rippled depressions oriented along the slopes. This microrelief corresponds in turn to clearly defined differences in the character of the soil-forming and underlying rocks. For example, on the ridges of the Sypsyn plain, the mantle of Quaternary sands and sandy loams under the ripple-like depressions has a thickness of 0.3 to 0.5 meter and is underlain by clay beds intercalated in Tertiary sandstones. Under the relatively higher sections between the depressions, the top of these clay beds lies at a greater depth and the mantle rock increases in thickness ranging from 1.0 to 2.5 meters.

In the soil cover, certain complexes of solonets and chestnut soils under corresponding plant associations are clearly associated with certain elements of the microrelief. On the field sketch mapped on one of the ridges of the Sypsyn plain Fig. 3(Page 66), the ripple-like depressions are occupied by solonchak-wormwood and fescue-solonchak wormwood associations developing on moderately solonized solonets soils of slightly loamy mechanical composition. The central level sections of the depressions are covered with associations dominated by black wormwood, camphor fume and biyurgun on moderately solonized solonets soils of the same mechanical composition. On relatively higher parts of the surface are chestnut solonets, chestnut soils and chestnut leached sandy loams. The chestnut solonets soils, covered with grudnik-fescue associations, occupy sections adjoining the ripple-like depressions, where the depth of the intercalated Tertiary clay beds ranges from 0.5 to 0.7 meter. As the Quaternary mantle rock increases in thickness to 1.0 meter, the chestnut solonets is replaced by chestnut soils developed under mixed herbaceous-steppe fescue-capillary feathergrass and wormwood-steppe fescue-capillary feathergrass associations. When the top of the Tertiary clay beds drops to 1.0-1.3 meters, chestnut leached soils are formed under associations dominated by capillary feathergrass and broad-leaved feathergrass, in addition to the mixed herbaceous cover typical of sandy soils.

As far as the species composition of the burrowing rodents is concerned, the steppe complexes are virtually identical with the complexes affected by ground waters. However, the rodents are far less numerous in the steppe complexes.

There are very few suslik mounds, and no mounds with a perennial, regular population. Mounds are represented chiefly by leveled and slumped forms of

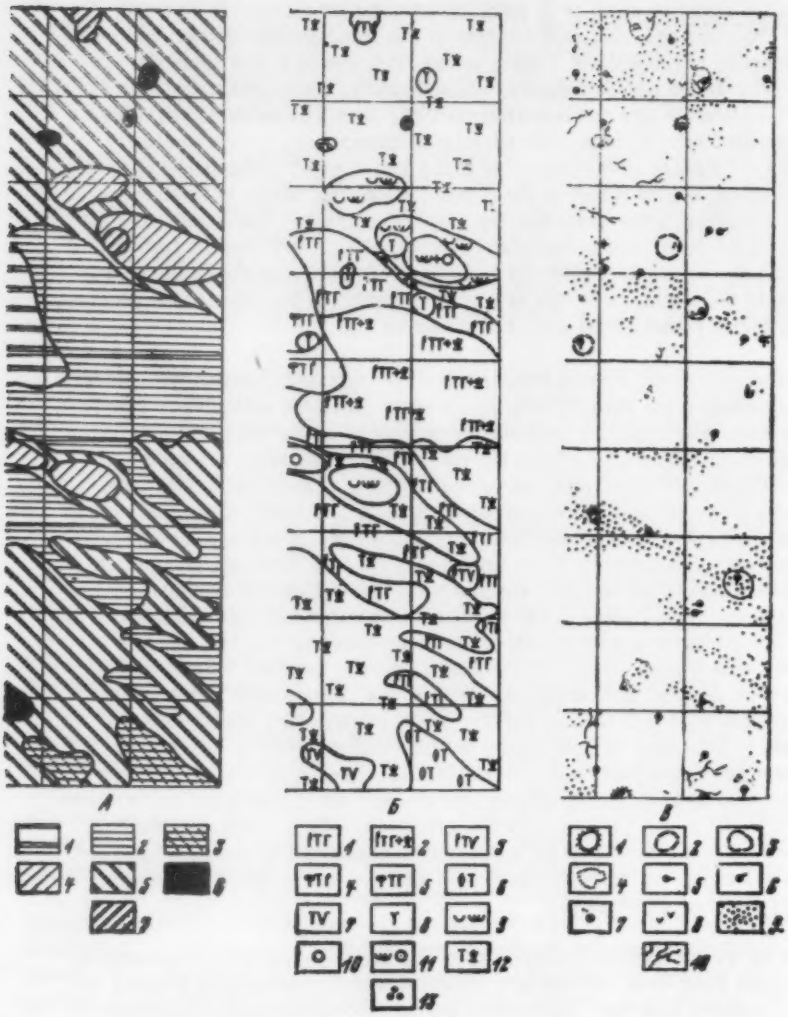

Fig. 3. Part of a field sketch of the steppe solonets complex of the Sypsyn plain, 2.5 km. west of Zhana-Daur village.

Legend (Fig. 3)

A. Soils:
1. leached chestnut
2. chestnut
3. chestnut solonets
4. moderately solonized steppe solonets
5. strongly solonized steppe solonets
6. "buried" steppe solonets
7. "degraded" steppe solonets

B. Vegetation:
1. polynok-steppe fescue-capillary feathergrass
2. polynok-steppe fescue-capillary feathergrass with solonchak wormwood
3. polynok-steppe fescue-tyrsik (Stipa sareptana)
4. mixed herbaceous-steppe fescue-feathergrass
5. mixed herbaceous-steppe fescue-tyrsik
6. grudnik-steppe fescue
7. wheatgrass-tyrsik
8. wheatgrass
9. camphor fume-black wormwood
10. biyurgun
11. black wormwood-biyurgun
12. steppe fescue-solonchak wormwood
13. single specimens of solonchak wormwood

C. Burrowing activity of rodents
1. material ejected by the small suslik
2. suslik mounds in process of destruction
3. leveled suslik mounds
4. slumped suslik mounds
5. inclined holes of the small suslik, inhabited
6. inclined holes of the small suslik, abandoned
7 vertical holes of the small suslik, abandoned
8. holes of the shorttailed steppe vole, abandoned
9. diggings
10. fissures in the soil surface

relatively small size, up to 2.5 meters in diameter. Occasionally there are mounds in process of destruction that reach a maximum height of 14 cm. On these mounds the upper excavated solonets layer shows occasional evidence of HCl effervescence; wheatgrass associations predominate in the plant cover. On the leveled and slumped suslik mounds, covered with associations dominated by wheatgrass, steppe fescue, polynok (Artemisia austriaca) and tyrsik (Stipa sareptana), there are fewer differences between the excavated layer and the underlying soil horizon on top of the solonets. The solonets horizon acquires such obvious features of degradation that in several cases such a buried solonets can be classified as a chestnut solonets soil. On the other hand, under suslik mounds on relatively higher sections of the ground, no special changes take place in the profile of the covered-up chestnut soils, except for evidence of burrowing. In this case a great deal of wheatgrass is present in the plant cover. Among the suslik mounds are occasional suslik holes.

The burrowing activity of the other rodents is even less significant. The short-tailed steppe vole is associated mainly with leveled and slumped suslik mounds. Outside of the suslik mounds the vole emerges seldom and then mainly along fissures. The vole also occurs in chestnut leached soils with no relation to suslik mounds.

Soil-loosening activity of rodents in the form of diggings is evident especially in chestnut soils, including its solonets varieties.

The foregoing demonstrates that the steppe solonets complexes exhibit a great deal of stability in the steppe-formation process, which in this case belongs to the bioclimatic cycle. (In general the contemporary trend of evolution of the steppe complexes can be explained only once we can answer the question of the origin of the salts in the soils: whether the salts are inherited from a preceding, more xerophytic era, or whether they represent the result of a very gradual salt-accumulation process (biological, impulverizing). There is a specialized literature on this problem (studies by V. A. Kovda, S. I. Shuvalova and others), and we will not discuss it further in this report.) The reclaiming effect of the relatively small number of rodents is insignificant here and does not have a special influence on the transformation of the complex.

In general we can conclude that the small suslik is the principal reclaiming agent among the burrowing rodents in solonets complexes of all types. The other smaller rodents play a secondary role in that respect. An exception is the meadow-steppe complexes, where the short-tailed steppe vole and the mole rat play a noticeable reclaiming role in addition to the small suslik.

The differences in the origin and the character of solonets complexes of all types and in the rate and the moving forces of the transformation of these complexes into steppe confirm the need for fundamentally different approaches to the problem of reclaiming them for agricultural purposes. For example, reclamation of the meadow solonets requires flushing and drainage. The most effective method of reclaiming meadow-steppe solonets is deep subsoil plowing,

as is shown by the character and the results of the burrowing activity of rodents. The steppe solonets is the most difficult to reclaim despite the absence of a link with ground waters. For example, plowing of the steppe solonets of the Sypsyn plain, which is characterized by relatively weak salinization, has not eliminated differences in the productivity of the soils, which vary sharply in the character of the soil-forming rocks and their chemical, water-physical and other properties.

THE COLLECTIVE WORK SOVETSKAYA GEOGRAFIYA, ITOGI I ZADACHI (SOVIET GEOGRAPHY, RESULTS AND TASKS) AND ITS CONTENT

Reviewed by I. P. Gerasimov

(From Izvestiya Akademii Nauk SSSR, seriya geograficheskaya, 1961, No. 1, pp. 158-161)

This collection is a scientific reference work of primary importance. It was written by a large group of scholars commissioned by the Geographical Society USSR. Its aim is to provide a full-fledged characterization of the present state of Soviet geography, its principal theoretical achievements and its study problems.

The preparation from time to time of fundamental reviews of this type is in the interest of geography itself; it makes it possible to evaluate critically the work done in the preceding period and to provide a solid basis for outlining future work.

Such a review is especially necessary for Soviet geography at the present time in connection with the ambitious tasks of the current (seven-year) and long-range plans of development of the national economy of the USSR that envisage the development of the productive forces of all geographical regions and the broad practical utilization of the achievements of Soviet science. In addition, this review is very timely in connection with the thorough revision of geographic research methods that is taking place at the present time through assimilation of the latest achievements of geophysics and geochemistry. Finally, the writing and publication of such a review is important for the development of international scientific ties, the active participation of Soviet geographers in the work of international scientific congresses and conferences, and the further strengthening of the world-wide authoritativeness of Soviet science.

These key objectives determined the program of the collection under review. (The table of contents appeared in Soviet Geography, March 1961, pp. 86-87.)

It is quite clear that the coordination of the writings of the more than 40

authors represented a difficult task for the editorial board. (This board, appointed by the Geographical Society USSR, consisted of I. P. Gerasimov, chairman; G. M. Ignat'yev, secretary; S. V. Kalesnik, O. A. Konstantinov, E. M. Murzayev and K. A. Salishchev.) That task was not completely solved. The collection contains some, occasionally rather substantial, contradictory elements that have been retained in part intentionally in the interests of independent authorship. A serious effort was made to limit such differences in which there was a divergence of scientific views. It is entirely legitimate to have argumentative treatment of certain theoretical problems of contemporary geography; the presentation of opposing views is always an important stimulus for the further development of science.

There are a number of important theoretical propositions in Soviet geography that are shared by the overwhelming majority of scholars. The collection under review makes an attempt to state these propositions in the introductory chapter, written by the author of the present article. The content of that introductory chapter can be summarized as follows, in very concise form:

1. The science of geography in the Soviet Union has gone along a long and diversified path of development. A number of stages of that development were passed in pre-revolutionary Russia. Soviet geography, which arose after the Great October Socialist Revolution, inherited a large and valuable legacy from pre-revolutionary Russian geography, expressed not only in a huge body of geographical facts, but also in a whole system of fruitful, progressive scientific traditions, schools and concepts, many of which have become classic. During the time of its existence Soviet geography has increased that scientific legacy many times over in the field of factual data, it has developed and enriched the classic scientific trends and has become the bearer of several new theoretical concepts developed on the basis of scientific Marxism-Leninism and in intimate connection with the practical aspects of Socialist construction.

2. In the development of contemporary Soviet geography there is a complex interweaving and interaction between the principal lines of the universal evolution of science and the specific characteristics of development of Soviet Socialist science. By presenting this complex situation in a somewhat schematic way, we can formulate the present tendencies in the development of Soviet geography as follows:

The general objective of geography, as one of the oldest sciences, has always been and continues to be the comprehensive study of the physical environment, population and the economy of a given country and its parts, of other countries and of the earth as a whole. Such study is designed to provide both a comprehensive characterization (description) and an explanation of the similarities and differences between physical conditions and local aspects of the economy and population. The scientific results of geographic research are widely used for practical purposes in the uncovering of natural resources, the agricultural development of areas, the rational distribution of industry, population centers and transportation lines, and for the purpose of developing the productive forces of regions and countries.

We reject categorically the idea that present-day geography has essentially fulfilled its cognitive-descriptive functions; that the entire earth, or at least its major inhabited part, has been adequately studied from a geographical point of view and that geography can therefore be regarded now as merely a general educational school discipline, needed not so much for scientific and practical purposes as for purely cultural purposes. Such a view of present-day geography is profoundly wrong and archaic.

Contemporary geography is a science of the 20th century. It is no longer an essentially descriptive-cognitive science having for its main object the study of hitherto unknown countries and regions. It is now a science with an experimental-transformative approach, having as its main object of study the long since discovered countries and regions that have been opened up by man and now have a thoroughly transformed physical environment, a dense population and a diversified economy.

Consequently the principal task of contemporary geography all over the world is to provide a comprehensive scientific service to the great work of mankind in achieving a diversified and increasingly intensive utilization of known natural resources and the transformation of nature and of the economy of already settled regions and countries.

It should be emphasized that the availability of powerful means of present-day technology not only does not simplify the new tasks of geographic research but, on the contrary, complicates those tasks because the effective use of such technology requires an especially thorough and differentiated knowledge of all aspects of the area in question and of the properties of the natural phenomena to be transformed.

3. In order to assure an adequately diversified geographic study of an area and its characteristic phenomena, satisfying present-day practical needs, and in order to provide a full-fledged scientific explanation of geographic features, based on modern scientific concepts, we require far more thorough and diversified scientific knowledge than before and we must be familiar with many new specialized methods of field and office research. Taken as a whole, all this cannot usually be executed at the present time within the framework of a single science and through the efforts of a single specialist. At the present stage of development of geography, a single science has become a whole system of sciences, and a single, universal, encyclopedic scholar is being replaced by the collective work of many specialized geographers, organized according to a single plan.

We can therefore say that the foundation of the present-day state of geography in the USSR, as in other countries, is made up by the complex process of formation and development of a whole system of scientific disciplines that are taking the place of the former science of geography.

4. The basic outlines of the present-day system of geographic sciences are already sufficiently clear in the USSR, as are the principles of differentiation and mutual links within that system.

From the point of view of Soviet geographers, it can be regarded as generally acknowledged that the object of study of the entire system of geographic sciences is the natural environment, i.e., the sum-total of the interrelated phenomena of nature that surround us on the earth's surface, as well as population and social production, and the relations between the natural environment and social production and the life of people.

It follows that at the present time the system of geographic sciences falls, in the first place, into two major divisions or subsystems: physical geography and economic geography, the latter including the geography of population. That subdivision follows from the very essence of the objects studied by the geography of natural phenomena, on the one hand, and by the geography of social phenomena (population and social production), on the other. That subdivision is based on the methodological principles that link the corresponding geographic disciplines (within the divisions of physical and economic geography) with the natural or social sciences. Physical geography, taken as a whole, studies from a geographical point of view the phenomena of nature and thus bases itself on the laws of structure and development established for these phenomena by the natural sciences. Economic geography studies social phenomena (the characteristics and distribution of the economy and population) and thus bases itself on the laws relating to the structure and development of society that have been formulated by the social-economic sciences.

5. The further breakdown of physical and economic geography is based on the following principles.

The basic theoretical tasks of physical geography are the study of the mutually conditioned complex of natural phenomena that make up the natural geographic environment (sphere or envelope) as a whole, as well as the study of individual components making up part of that environment. The first task constitutes the subject of the general department of physical geography or earth science, which is concerned with the natural geographic environment as a whole on a global scale. The characterization and explanation of similarities and differences in the geographic environment within parts of the earth's surface (i.e., the study of natural geographic regions or landscapes) constitutes the subject of the regional department of physical geography or landscape science.

In view of the fact that complex combinations of natural phenomena are the direct object of study of both the general and the regional departments of physical geography (i.e., earth science and landscape science), these geographic sciences have a specific synthetic content, generalizing the diversified findings of many other geographic sciences.

The study, from a geographic point of view, of individual components of the natural geographic environment constitutes the subject of a whole series of particular or analytical physical-geographic scientific disciplines (for example, climatology, hydrology, geomorphology, soil science, botanical

geography, zoogeography and others), which together make up a third specialized or analytical department of physical geography.

It must be emphasized that the geographic sciences making up that department are intimately interrelated with the two other departments. In their synthesis of scientific data, the latter are "fed" directly by the analytical disciplines, which in turn base themselves on general and regional geographic laws.

The basic theoretical task of economic geography is to establish the laws of geographical distribution of population and social production. Consequently, in addition to the general and regional departments of economic geography, concerned with the composition and settlement of population throughout the world and with the distribution of social production as a whole or within individual countries and regions, geography in the USSR is beginning to experience the increasing differentiation of a set of independent scientific disciplines making up a specialized or segmental department of economic geography, such as the geography of population, the geography of industry, agriculture, transportation and so forth.

6. The process of setting up and differentiating the various departments and individual disciplines in the contemporary system of geographic sciences in the USSR, reflecting the general laws of development of the science, is an uneven and contradictory one. The varying degree of development of any given discipline, the varying degree of consolidation and the uneven level of theoretical and practical achievements make up a rather complex picture, in which many phenomena are only temporary and incidental. The undeviating aggressive development of the new in the geographic sciences, as in anything else, runs up against old established concepts and positions. The latter do not give in without a fight, which results for a time in a changeable situation. All this is reflected in present-day Soviet geographical literature, which, if read systematically, yields rich material for the study of the process of stormy development of the whole system of geographic sciences under a Socialist social system.

The book under review is designed for various kinds of readers. In addition to geographers in the broad sense, that is scholars in the geographic, economic and biological sciences, as well as professors in the corresponding faculties of higher educational institutions, the book will interest many persons in planning and design agencies, economists working in industry, agriculture and transportation, and other specialists dealing with natural conditions, the utilization and conservation of natural resources and the development of productive forces in various regions of the USSR.

Chauncy D. Harris and Jerome D. Fellmann. International List of Geographical Serials. University of Chicago, 1960, 189 pp.
(Reviewed by M. P. Petrov)

The authors set themselves, and successfully fulfilled, the task of listing the world's geographical serials, both those published at the present time and those that have ceased publication. By serials, the authors understand all numbered publications. They may be either periodicals published at regular intervals or nonperiodical serials that appear regularly but are numbered consecutively, such as the serial Voprosy geografii.

The book opens with a list of 52 scientific institutions, libraries and individuals who have collaborated in the compilation of the list of serials and a listing of 47 sources of titles and bibliographical data. From the Soviet Union, data were supplied by the Geographical Society USSR and the Institute of Geography of the Academy of Sciences USSR. The participation of representatives from the principal countries of the world in the preparation of the list of serials has insured almost complete comprehensiveness.

In the introduction, printed in four languages -- English, French, German and Russian -- there is a statement of the purpose and the principles of compilation of the list.

The basic part of the book consists of a list of geographical serials by countries, arranged in alphabetical order (in the Latin alphabet) from Algeria to Yugoslavia. Within each country appears, also in alphabetical order, a list of titles of serials and of geographic institutions, societies and higher educational establishments with geography faculties that publish their own serials. Currently published serials are designated with a special symbol. For publications using a non-Latin alphabet -- Japanese, Chinese, Russian, Ukrainian, Serbian, Yugoslav and Bulgarian -- the listings appear in the language of the corresponding country in addition to the Latin transliteration. Such an arrangement makes it possible for the reader to orient himself easily in the whole complexity of geographical serials in the regional section.

The list contains 1,649 titles of geographical serials once published and now being published in 71 countries. Complete bibliographical information is provided for each item: title, place and year of publication, volumes or numbers published, frequency of publication and additional information on name changes, the languages in which the main text and abstracts are printed; this is followed by the address of publication (for current serials only). Periodicals in surveying and technical cartography have been excluded.

For the Soviet Union there are 205 titles of geographical serials, ranging from the Zapiski of the Geographical Society that began publication in 1846, and including not only publications of the central geographic institutions and universities, but such provincial publications as the Trudy of the Turkmen Geographical Society or of the Komi branch of the Geographical Society USSR in Syktyvkar.

To facilitate use of the list, it contains at the end an alphabetical index of the institutions, universities, societies and their serial publications.

Unfortunately it must be noted that the Soviet literature still lacks a complete listing of Russian and Soviet geographical publications.

Of interest are relative data on the total number of serials ever published in the principal countries. First is Germany with 336 titles, followed by Russia-USSR with 205 titles, France with 132, the United States with 112 and Britain and Italy with 72 each. These countries also publish the largest number of serials at the present time: East and West Germany 74, the USSR and the United States 43 each, Britain 33, France 32 and Italy 24.

The large number of Soviet serials is due to the fact that in recent years nearly all the branches of the Geographical Society USSR have started publishing their own Trudy or Izvestiya.

Despite the fact that Soviet bibliographical geographers supplied the authors with data on Russian and Soviet serials, the list is not complete. For example, the following serials are missing:

1. Uchenye zapiski of Leningrad Pedagogical Institute named for A. I. Gertsen, Geography Faculty, Departments of Physical Geography and Economic Geography -- 1936, 1946, 1948, 1954, 1956, 1957, 1958.
2. Uchenye zapiski of Turkmen State University, Department of Geography, 1959.
3. Uchenye zapiski of Leningrad Pedagogical Institute named for M. N. Pokrovskiy, Department of Geography, 1948, 1955, 1957.

Possibly the list also misses the serials of other pedagogical institutes.

The book under review is the result of the authors' long and painstaking work. The first attempt to compile such a list was made in 1950 and published twice (Chauncy D. Harris and Jerome D. Fellmann, "Geographical Serials," Geographical Review, 1950, No. 4, pp. 649-56; A Union List of Geographical Serials, University of Chicago, Department of Geography, Research Paper No. 10, 1950). The present (third) edition of the list of geographical serials is far more complete. This is due to a more complete assembling of titles, but also the appearance in the last ten years of a large number of new serials both in countries with a long tradition of geographic research and in countries that have only recently become centers of geographic research.

The publication of the International List of Geographical Serials by the University of Chicago is a significant event in world geographical literature. The list will be useful and of great interest to bibliographers and geographers of all specializations.

A SOVIET REVIEW OF SOVIET GEOGRAPHY

(From Izvestiya Akademii Nauk SSSR, seriya geograficheskaya, 1961, No.1, pp. 161-163)

At the beginning of 1960 the American Geographical Society in New York started the publication of a new journal Soviet Geography: Review and Translation. The aim of the publication, as worded in a brief statement on the inside of the cover of each issue, is "to make available in English reports of current Soviet research in geography." The publishers of the journal base themselves on the premise that "dissemination of the fruits of Soviet geographic research would be a service to American geographers and would help bring about professional contacts between geographers of the two countries." It is proposed to publish ten issues a year, each of about 80 pages. Publication of the journal is supported by a grant from the National Science Foundation.

The establishment of the journal Soviet Geography in the United States is not surprising. It demonstrates the growing interest of American scholars in Soviet science and the thorough reassessment of Soviet scientific achievements that has been taking place in recent years in the United States; it also acknowledges the world-wide significance of work done by scholars of the Soviet Union. Until recently the Soviet literature was used in the United States mainly as a source of factual data for special purposes by a more or less limited group of persons who were usually specializing in the study of the USSR, and therefore there was no need for special journals devoted to individual branches of Soviet science. Now American scholars of a wide range of disciplines are showing lively interest in work being done in the USSR. These scholars know that otherwise they may lag behind the level of world science, to whose forefront Soviet scholars have now advanced. The fact that this interest is found not only in the technical and exact sciences, but also in the geological-geographical and economic sciences is shown by the establishment in recent years of several American periodicals devoted to the development of those sciences in the USSR. Since 1958 the American Institute of Biological Sciences is publishing an English translation of the Soviet journal Pochvovedeniye (Soil Science). The International Arts and Sciences Press is publishing the monthly Problems of Economics, which contains translations of articles from Soviet economic journals and newspapers. The Department of Commerce makes available English abstracts of the contents of some Soviet journals, including Izvestiya Akademii Nauk SSSR, seriya geograficheskaya; Geodeziya i kartografiya; Meteorologiya i gidrologiya; Gidrotekhnika i melioratsiya. Now we also have the journal Soviet Geography under review.

In recent years the Soviet Union has been visited by quite a number of American geographers, who had an opportunity to convince themselves personally of the high level of geographic research in the USSR and of the fact that Soviet geographers are familiar with the geographic literature published abroad, including the American. The Soviet abstracts journal Geografiya

publishes abstracts of virtually all articles of a geographic character that are of scientific value. Soviet journals print reviews of the principal geographic studies published in the United States. Several geography books published in the United States have been translated into Russian, including the great monograph American Geography, Inventory and Prospect . Finally, Soviet publications print review articles of individual geographic disciplines in the United States (examples are the articles "The Geography of Industry in the United States" and "The Geography of Agriculture in the United States," published in Voprosy geografii, No. 44). On the other hand the only books that have been translated into English out of the rich Soviet geographical literature are L. S. Berg's Natural Regions of the USSR and two textbooks on the economic geography of the USSR: N. N. Baranskiy's and the one by S. S. Balzak, V. F. Vasyutin and Ya. G. Feygin, published in the USSR in 1940.

Furthermore there are far more Soviet geographers who know English, i.e., who can read the American literature in the original, than there are American geographers who know Russian. In this connection it is interesting to note that the Advisory Committee of Soviet Geography consists almost entirely of geographers who have specialized in the study of the USSR (and who therefore know Russian more or less well); the editor of the journal is Theodore Shabad, author of several studies on the USSR. The Advisory Committee includes Chauncy Harris, George Cressey, Douglas Jackson, David Hooson, Huey Kostanick, Paul Lydolph, Aloys Michel, John Morrison, Allan Rodgers, Robert Taaffe, Jack Villmow and Edward Espenshade, the cartographer. Most of them have been in the USSR and know many Soviet geographers personally.

On the basis of the six issues (Nos. 1-2, 3, 4, 5, 6, 7 of 1960) of Soviet Geography available at the time of writing, we can form an idea about the kind of material that attracts most of the attention of the publishers and is given priority of publication. This material includes, first of all, reviews of the state of Soviet geography as a whole and of its major branches, as well as reports of activities of geography institutes, the geographical society, and so forth. Translations along these lines include I. P. Gerasimov's "The Present Status and Aims of Soviet Geography," E. M. Murzayev's "Results and Aims of Physical Regional Geography in the USSR," S. N. Ryazantsev's "The Results and Tasks of Studies in Regional Economic Geography at the Institute of Geography of the Academy of Sciences USSR," reports on the work of the Institute of Geography for 1957 and 1958, prepared by D. V. Kravchenko; the article "The Forthcoming Congress of the Geographical Society of the USSR and Its Program," the report on the activities of the Geographical Society USSR in the period 1955-59, the report of the National Committee of Soviet Geographers on the development of international scientific contacts and their importance for further progress of Soviet geography. Starting with No. 5, 1960, the journal has been publishing the papers presented at the Third Congress of the Geographical Society USSR, using for that purpose the preprints prepared for the congress.

Special attention is also given to articles on the economic geography of the USSR, including questions of economic regionalization. The six issues under review contain about 15 translations of articles dealing with these questions, including a selection of articles devoted to the development of productive forces under the seven-year plan, taken from No. 3, 1959, of Izvestiya Akademii Nauk SSSR, seriya geograficheskaya; an article by V. A. Krotov, M. I. Pomus and G. D. Rikhter on "Ways of Developing the Productive Forces of Eastern Siberia"; A. G. Omarovskiy's "Changes in the Geography of Machine Building in the USSR"; an article by Yu. G. Saushkin and T. M. Kalashnikova on "Current Problems in the Economic Regionalization of the USSR"; V. V. Pokshishevskiy's "The Role of Population Geography in Problems of Economic Regionalization of the USSR," and others.

Several articles, mainly papers from the Third Congress of the Geographical Society USSR, deal with the problem of utilization and conservation of natural resources.

Thus far inadequate space has been given to problems in physical geography, which is covered by only half a dozen short articles. An exception is the long and very important article by A. A. Grigor'yev and M. I. Budyko on "Classification of the Climates of the USSR," in No. 5, 1960.

The selection of articles dealing with the geography of foreign countries is somewhat puzzling. Although relatively little space has been devoted to them thus far, the editor found it necessary for some reason to publish in No. 3, 1960, A. K. Arskiy's review of B. N. Semevskiy's textbook on the United States; Semevskiy's letter to the editor of Izvestiya VGO regarding that review, and Semevskiy's "Some Impressions From a Visit to the United States," also published in Izvestiya VGO. Arskiy's review pointed out the serious shortcomings of Semevskiy's small text, published in a very limited printing in 1956, and emphasized the fact that the text did not correspond to the present level of Soviet studies on the United States and might create a wrong impression. As regards Semevskiy's short report of his impressions during a brief tourist trip to the United States, this could hardly have been of serious interest to American readers. According to an introductory note of the editor of Soviet Geography, one of the reasons for the selection of that article was that "it typifies the kind of impressions obtained on a casual and rather superficial visit to a strange country. Readers will note a considerable number of factual errors, particularly in names and figures." It is quite obvious that this article, especially with such an "introduction" and in combination with Arskiy's review, gives an entirely incorrect picture of Soviet geographic science, particularly Soviet study of the geography of the United States and foreign countries in general. Nowhere does the journal say anything about the major studies on the economic geography of the United States that have been published in the USSR. The publication in Soviet Geography of this selection of items cannot be interpreted other than as an attempt to distort one of the fields of study of Soviet geography and thus indirectly to cast aspersions on all Soviet geography. (Editor's note, S.G.:

The Editor denies that such was his intent in publishing the articles in question. The very fact of the publication of Soviet Geography demonstrates a desire to publicize the positive achievements of Soviet geography among English readers.)

As noted in the statement of aims on the cover of Soviet Geography, most of the translated articles are taken from such publications as Izvestiya AN SSSR, seriya geograficheskaya; Izvestiya VGO and Voprosy geografii. In general that is true. However the few regional articles that have been translated are taken mainly from the journal Geografiya v shkole and are essentially factual in character without any attempt to treat scientific problems. This is to be expected in articles designed to provide teachers with material for instruction; however such articles can hardly give the American reader a correct picture of Soviet regional studies, especially when the major regional works published in the USSR are passed over in silence.

In addition to its articles, Soviet Geography prints translations of a few reviews of Soviet books and maps published in Soviet journals, as well as translations of Soviet reviews of American geographic publications.

Each issue of Soviet Geography contains factual news notes culled from Soviet journals and newspapers that may be of interest to American geographers. Unfortunately, the editor, T. Shabad, who prepares this material, does not usually cite sources for the news notes. (Sources have been cited since the December 1960 issue -- Editor, S. G.)

On the last few pages of each issue are translations of the tables of contents of current Soviet periodicals and serials received in the United States.

The journal Soviet Geography carries the subtitle Review and Translation. However in the first six issues there is not a single original review article. Evidently this is a matter for the future. It is also regrettable that the journal is limited to a survey of Soviet periodicals and does not cover geography books published in the USSR. It would be interesting to see serious reviews of geographic studies published in the USSR, including studies about the United States. -- V. M. Venin.

NEWS NOTES

By Theodore Shabad

The Forest Products Industry of the RSFSR. Further details have been published by the Gosplan (State Planning Committee) of the RSFSR (Ekonomicheskaya Gazeta, March 14, 1961). The forests of the RSFSR include 56 billion cubic meters of mature and over-aged stands. More than 70 per cent of the forest reserves are in inaccessible parts of Siberia and the Far East. Because of various reasons, including an acute shortage of industrial wood, removals until 1948-50 were concentrated in the populated regions of European Russia near consumption centers. Only since 1950 has a major part of the removals shifted to northern and eastern regions. By 1960, removals in those regions amounted to 148.4 million cubic meters of roundwood compared with 88.6 million in 1950, while in the less-forested areas of Central Russia and the Volga Region roundwood removals dropped from 45.7 million to 36.6 million cubic meters.

For forest-management purposes, forests are divided into groups. In the last five years, 30 million hectares have been shifted to Groups 1 and 2, in which removals are strictly limited. However, because of slow development of the forest-products industry in the heavily forested regions, overcutting has been permitted in Group 2 forests. In 1959 such overcutting amounted to 4.1 million cubic meters. Overcutting was permitted in 1960 and is being permitted in 1961 by the Council of Ministers USSR.

To insure proper forest management in the less-forested areas, eliminate overcutting and develop removals in the North and in Siberia, construction is now under way on the railroads Ivdel'-Ob' River (northern Sverdlovsk and Tyumen' oblasts; see Soviet Geography, April 1960, p. 86), Mikun'-Koslan-Yertom (Komi ASSR; Soviet Geography, April 1961, p.72) and Achinsk-Abalakovo (Krasnoyarsk Kray). In 1961 construction is expected to start on the railroads Asino-Belyy Yar (northern Tomsk Oblast), Tavda-Sotnik (eastern Sverdlovsk and Tyumen' oblasts) and Arkhangel'sk-Karpogory (eastern Arkhangel'sk Oblast).

The Ivdel'-Ob' railroad will make accessible forest areas with total reserves of 2 billion cubic meters of wood. The Achinsk-Abalakovo railroad will reach 1.2 billion cubic meters of wood.

Additional capacities for the removal of wood amount to 11 million cubic meters each year. In 1962-63 the increase in capacity is planned at 16-17 million cubic meters. Annual investments in the expansion of wood removals amount to 3 billion (old) rubles, of which 500 million go into railroad construction. The construction of railroads and the expansion of lumbering enterprises in heavily forested areas of the North and Siberia are expected in the next few years to eliminate the need for overcutting in the less-forested areas of Central Russia.

Another serious shortcoming to be eliminated is the inadequate utilization of wood, especially pulpwood, in the processing industry. This is due to the fact that the construction of processing plants has lagged behind the increase in wood removals. The seven-year plan (1959-65) calls for speedier construction of processing plants, especially those producing paper, paperboard and fiberboard.

In 1959-65 the pulp industry of the RSFSR is planned to expand its capacity by 5,650,000 tons compared with an increase of capacity of 116,000 tons during the seven-year period 1952-58. RSFSR paperboard production in 1959-65 is scheduled to increase its capacity by 3,700,000 tons compared with a 46,000-ton increase in 1952-58. (Paperboard production in 1958 was 433,000 tons.)

Large projects are under way to expand wood processing in Siberia. In 1960 the first paper-and-pulp mill of Siberia went into operation at Krasnoyarsk; by 1963 a paperboard mill with an annual output of 200,000 tons of board and a processing capacity of 800,000 tons of pulpwood will begin. The first section of the Bratsk mill, with a designed capacity of 280,000 tons of paperboard and 540,000 tons of pulp, is expected to go into operation in 1962.

In 1963, after inauguration of the pulp-and-paper mill now under construction at Kotlas with a designed capacity of 410,000 tons of paper and board, the now unmarketable low grades of wood originating in the middle Komi ASSR, southeast Arkhangel'sk and northern Kirov oblasts will find a market.

Akmolinsk is Renamed Tselinograd. Akmolinsk, the new administrative center of Tselinnyy (Virgin Lands) Kray of the Kazakh SSR, has been renamed Tselinograd (Pravda, March 21, 1961). The city was renamed upon a suggestion of Premier Khrushchev, who thought that the old name, meaning "white tomb" in Kazakh, was not suitable for the government center of a rapidly developing region. Akmolinsk was founded in 1824 as a Russian fortress on an old caravan route linking Siberia and Central Asia. It became a regional administrative center in the 1860's. The city's industrial development dates from 1930, when it was first reached by a railroad. The city's population increased from 33,000 in 1939 to 101,000 in 1959 as it developed into a regional center for an important agricultural area of northern Kazakhstan. The population is employed primarily on the railroad, in the processing of agricultural products and in manufacturing (agricultural machinery).

Population Shift in Tadzhikistan. The population of Ayni (the former Zakhmatabad) Rayon, situated in the upper valley of the Zeravshan River, is being resettled in the Tadzhik section of the Golodnaya (Hunger) Steppe (Kommunist Tadzhikistana, August 27, 1960; March 1, 1961). Most of the population of the rayon, numbering 27,294 in the 1959 census, is being moved from their old mountain homesteads, where they derived a

livelihood from stock raising and fruit growing. The new settlement area, covering about 50,000 hectares, was transferred from the Uzbek SSR to the Tadzhik SSR in 1959. The area is situated along the north foot of the Turkestan Mountains between the Begovat-Ursat'yevskaya-Obruchevo railroad and Ura-Tyube. The main economic activity is irrigated cotton growing, providing a higher income than the previous mountain economy. Only a small part of the population is staying behind in the mountains to look after the livestock and orchards. The Ayni migration is the second organized transfer of population from the upper Zeravshan valley. In 1956-57 the population of Matcha Rayon, situated in the valley above Ayni, was also resettled in the lowlands to engage in irrigated cotton farming. The new Matcha Rayon was established in the Dal'verzin Steppe on the right bank of the Syr Darya, north of Begovat.

CURRENT LITERATURE

Izvestiya Akademii Nauk SSSR, seriya geograficheskaya, January-February 1961

The radiation balance of the Northern Hemisphere. M. I. Budyko, N. A. Yefimova, V. V. Mukhenberg, L. A. Strokina 3

The natural prairie landscapes of the Soviet Far East and their origin. V. P. Kolesnikov, Yu. A. Liverovskiy, V. V. Nikol'skaya 13

An integrated natural regionalization of China. Huang Ping-wei (Chinese People's Republic) 25

The deglaciation of northern Sweden. Hans W:son Ahlmann 40

The rational utilization of natural resources and the tasks of Soviet geography. D. L. Armand 48

The dust storms of March-April 1960. A. G. Gayel', A. G. Doskach, A. A. Trushkovskiy 57

The geographical basis of economic development of the Volga-Akhtuba floodplain and the Volga delta. M. S. Buyanovskiy, M. I. L'vovich 68

Some characteristics of formation and ways of development of the Central Region of the USSR. A. A. Mints 79

Intrazonal features of melt-water runoff in the mixed-forest zone. S. V. Bass 89

Characteristics of the formation of surface runoff on various types of agricultural lands in the wooded steppe of the European part of the USSR. A. M. Grin 95

The role of Pleistocene glaciation in the reshaping of the drainage pattern in the upper Zeya basin. V. V. Nikol'skaya 103

The geomorphology of the Tereblya and Rika river basins in Transcarpathia. B. P. Vysotskiy 110

The geomorphic structure and recent tectonics in the northeast margin of the Kazakh hill country. Ye. A. Fin'ko 117

New cross sections through Moscow-Valday (Mikulino) interglacial deposits on the Bol'shaya Dubenka River near the village of Sosnovatka, Kalinin Oblast. N. S. Chebotareva, M. A. Nedoshivina, T. I. Stolyarova 124
Methods of studying rhythmic lithological non-uniformity of loess and its importance for paleogeography. L. G. Balayev 128
The map exhibits at the 19th International Geographical Congress. K. A. Salishchev, I. P. Zarutskaya, A. M. Komkov 138
The literature on Scandinavia and Finland distributed by the Organizing Committee of the 19th International Geographical Congress. E. D. Zhibitskaya 141
Geographical publications issued in the USSR in connection with the 19th International Geographical Congress. G. D. Rikhter, V. V. Pokshishevskiy 144
The trip of Soviet geographers through northern Scandinavia. V. P. Kovalevskiy 146
Problems of the geography and classification of soils at the 7th International Soil-Science Congress (Madison, August 1960). N. N. Rozov 149
Vegetation mapping principles and methods (97th international conference of the Centre National de la Recherche Scientifique, Toulouse, May 1960). V. B. Sochava 152
The collective work Sovetskaya geografiya: Itogi i zadachi (Soviet Geography: Results and Tasks) and its contents. I. P. Gerasimov 158
The new American geography journal Soviet Geography. V. M. Venin 161
The results of the conference on measures against soil erosion and mudflows (Tashkent, September-October 1960). A. V. Yermakov, V. Ye. Ioganson 164
A regional conference of economic geographers of the Baltic republics (Tartu, September 1960). A. A. Mints, O. R. Nazarevskiy 166
A joint conference of the Urals branch of the Academy of Sciences USSR and the Perm' Regional Economic Council, devoted to the study of the productive forces of Perm' Oblast (Perm', June 1960). O. A. Kibal'chich 168
Academician V. N. Sukachev, Soviet geobotanist, honored on his 80th birthday. M. I. Neyshtadt 171
The visit of Hans W:son Ahlmann, Swedish geographer, to the Soviet Union (October 1960). L. R. Serebryannyy 172

Izvestiya Vsesoyuznogo Geograficheskogo Obshchestva
January-February 1961

Stanislav V. Kalesnik on his 60th birthday 3
The present phase of intra-secular fluctuations of mountain glaciation in the Northern Hemisphere. A.V. Shnitnikov 8

An attempt to study biogeocoenoses in the Tellerman forest of Voronezh Oblast. Ye. M. Lavrenko 23
A trip to the Canadian Arctic. B. A. Tikhomirov 34
On methods and problems in transportation geography. Juliusz Mikolajski 46
Cyclonic activity in the Antarctic. P. D. Astapenko 56
A possible method of quantitative characterization of the continentality of climate. Ye. F. Babenkov 63
The origin of small depressions in the Chelyabinsk-Chumlyak district of the Trans-Urals wooded steppe. M. A. Man'ko 65
The use of plants as an indicator in the interpretation of aerial photographs of desert landscapes in western Turkmenia. B. V. Vinogradov 69
A permanent climatic divide on the north slope of the Terskey Alatau. I. M. Zabelin 76
The accumulation of ice-flow sediments in the Far East. A. P. Nechayev 76
Changes in the geography of population centers in connection with filling of the Tsimlyansk Reservoir. M. N. Khromov 79
The original settlement of the Anadyr' river basin. I. A. Nekrasov 81
National atlases and various ways of compiling them. V.G. Churkin 83
A forgotten Russian geographer -- Dmitriy Kantemir. N.L. Rymbu 85
Reviews:
I. Kh. Ovdiyenko. Kitay; ekonomiko-geograficheskiy ocherk (China, an Economic Geography)-- Reviewed by B. N. Semevskiy 91
Chauncy D. Harris and Jerome D. Fellmann. International List of Geographical Serials -- Reviewed by M.P. Petrov 92
Mikhail A. Tsvetkov, Soviet geographer (obituary) 94
A regional conference of economic geographers of the Baltic republics on problems of urban geography (Tartu, September 1960). E. V. Knobel'sdorf 96
Problems of medical geography of Siberia and the Far East (Irkutsk, November 1960). Ye. I. Ignat'yev 98
A conference on the "sun-troposphere" problem (Leningrad, February 1960). I. Buchinskiy 99